# Part One The industry at present

# Chapter 1 Present production and facilities

## 1.1 The processes and products of the industry

Throughout most of its history, the identity of the wool textile industry has been clearly definable in that it dealt almost exclusively with the processing of animal as opposed to vegetable fibres. This in turn led to the development of machinery, the use of operating practices, and particular end-uses which enabled the limits of the industry to be clearly defined.

Since the late 1920's, however, and especially since about 1950, this simple raw material definition has become increasingly less valid because of the advent of man-made fibres. The position has now been reached where consumption of man-made fibres by all United Kingdom textile industries is approximately equal to that of all natural fibres. The increasing use in the wool textile industry of multi-fibre blends, and the corresponding use of machinery which can handle fibres other than wool, albeit with modified settings, means that any current definition of the boundaries of the industry must to some extent be arbitrary. It also means that, since other UK textile industries are major users of man-made fibres, there is an increasing level of competition between the UK textile industries, in addition to that provided by overseas wool textile industries.

Figure 1.1 illustrates in diagrammatic form the boundaries of the industry as adopted for the purposes of the study. The processes of material preparation (animal and man-made fibre), yarn production and fabric manufacturing have been taken as the core of the industry, the upstream boundary being assumed to be the purchase of raw fibre, either in the country of origin for imported fibres, or in the UK. Thus the fibre-selling procedure prior to auction or sale is not regarded as part of the wool textile industry, whereas buying and wool merchanting are included in the industry.

The downstream boundary has been assumed to be the interface between the fabric-finishing process and the immediate purchaser, irrespective of whether he is a home-trade cloth merchant, clothier, tailor, maker-up or export agent. The side boundaries present the greatest degree of arbitrariness in definition; very close relationships exist with the carpet industry and with the knitting industry, and both of these must come within the scope of the study. As Figure 1.1 indicates, the knitting and carpet industries have been regarded as customer and competitor industries of the wool textile industry proper, rather than as integral parts of it.

The product range of the wool textile industry is extremely wide, a point which is discussed further in Chapter 3. Even a simple classification by fibre composition, spinning system, design, weight and end-use leads to there being over a million distinguishable products. To make the study possible at all, it is therefore necessary to classify products much more generically than suggested above. Indeed, the same is true of the processes, of which over a hundred exist in practice within the four basic stages illustrated on Figure 1.1.

To avoid unnecessary detail, therefore, the processes and products of the industry have been classified into a dozen or so primary process areas and nine primary products. These process areas are designated by the activity of major importance within them, and have been selected so that distinguishable and (in most cases) saleable products can be defined at the start and finish of each primary process. Figure 1.2 shows the primary processes, products and terminology adopted, and the flows of raw and semi-processed materials through the industry.

The production of knitwear, and to a lesser extent that of knitted fabric, is not normally accepted as being an integral part of the wool textile industry's activities. One reason is that the majority of knitting capacity is installed in regions separate from the wool textile regions;

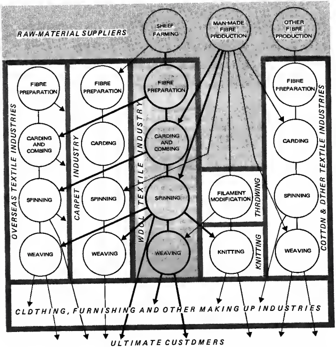


FIGURE 1.1 – BOUNDARIES OF THE INDUSTRY

a second is that a large proportion of knitted goods (e.g. stockings, warp-knitted shirtings) bear no relationship whatever to the wool textile industry. A few wool textile companies have interests in knitting (mainly jersey fabrics) but the present degree of involvement is not sufficiently great to warrant its inclusion as a major current activity of the industry. Nevertheless, because knitting represents a potential field for diversification, it has been included on Figure 1.2. In view of its marginal nature to the industry at present, and the fact that individual company details must not be divulged, the arbitrary assumption has been made that current annual production within the industry is less than ½ million pounds weight. Figure 1.2 also includes other non-woven fabric processes which, although defined as being outside the present industry, are also possible areas for diversification, whose future production will directly affect parts of the wool textile industry as defined.

The industry is considered to have three sources of raw materials (new wool and hair, wastes, and man-made fibres) and three main production systems (worsted, woollen and semi worsted). The nine primary products of the industry are tops, scoured wool, worsted, woollen and semi-worsted yarns, woven worsted and woollen cloths, knitted goods and other non-woven fabrics.

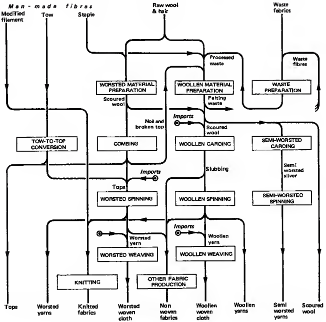


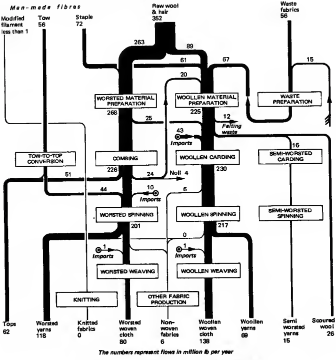
FIGURE 1.2 – THE PRIMARY PROCESSES AND MATERIALS

Within each of the primary processes, as mentioned earlier, there is a sequence of detailed secondary operations: for example, worsted spinning includes all processes from the reception of the top to the delivery of the worsted yarn on the package, including drawing, spinning, twisting and winding as required. In practice there would also be several alternative process routes through these secondary activities: for example, in worsted spinning, a choice exists of old Bradford or new Bradford, Continental or American drawing, followed by one of a number of types of ring, cap, flyer or mule spinning, with twisting and winding as necessary. The actual processes have been considered in sufficient detail to enable a full appreciation of their relative merits and potential to be ascertained, and hence to enable strategic recommendations and implications to be formulated.

## 1.2 Present levels of production

Present levels of production throughout the industry have been established by drawing up the complete pattern of process activity for the latest possible year, and adjusting this, where necessary, to eliminate localised transient effects which do not form a part of the overall trend in production for the industry. In order to do this, it was necessary to look back at the total outputs for the past five years, and from these to determine the underlying trends.

A number of sources of information were used. These included the results of the questionnaires circulated throughout the industry during the early part of 1968, the statistics provided by the Wool Industry Bureau of Statistics (WIBS), and some unpublished data from a number of additional sources. From these, the total outputs of the products leaving the United Kingdom industry (either as finished cloth or yarn, or part-processed material) were established. The detailed information was built up by considering the machinery installed and activity level within each process sector, together with the relevant imports and exports of the intermediate products. In this process of reconciling the information provided by the various sources, due account has been taken of the fact that in certain areas, the definitions of the boundaries of the industry are not always coincident: for example, the questionnaires drew a response from a larger number of semi-worsted yarn producers than are normally covered by WIBS statistics.



*The numbers represent flows in million lb per year*

FIGURE 1.3 – PRESENT LEVELS OF PRODUCTION

Figure 1.3 shows the present productions and flows through the industry in million lb per year, using the framework of Figure 1.2. It will be seen that woollen fabrics represent the largest single end-product in terms of weight, with worsted yarns and worsted fabrics being the second and third largest. There is little transfer of materials between the worsted, woollen and semi-worsted systems apart from wool scoured by operators within the worsted system on behalf of woollen operators, and the flow of noils and broken tops from the worsted system to the woollen. Imports of yarns are very small; those of tops are about 5 per cent of UK production, and imports of scoured wool are about 20 per cent of total input to woollen cards.

In recent years production of woollen yarns, woollen cloth and worsted cloth have all remained static; outputs of combed tops and worsted yarns have decreased by about 6 per cent and 4 per cent per year respectively, whilst production of semi-worsted yarns and converted man-made fibre tops has increased by about 15 per cent and 18 per cent per year respectively. Present production levels, derived from Figure 1.3, are summarised below, in million lb per year:

| | |
|---|---|
| Combed tops | 202 |
| Converted tops | 55 |
| Worsted yarn | 201 |
| Woollen yarn | 217 |
| Semi-worsted yarn | 15 |
| Worsted woven cloth | 80 |
| Woollen woven cloth | 138 |
| Non-woven fabrics | 6 |
| Knitted fabrics | 0 |

The quantities of raw materials used by the industry are also shown on Figure 1.3, and are given in more detail in Table 1.1.

Table 1.1 – Present use of raw materials

| | *Intake (m lb per year)* | |
|---|---|---|
| *Fibre* | *Worsted system* | *Woollen and semi-worsted* |
| *New wool and hair:* | | |
| Merino | 133 | 28 |
| Crossbred | 115 | 102* |
| Hair | 15 | 6 |
| Others | – | 21 |
| *Wastes:* | | |
| Process wastes | – | 13 |
| Mungo and shoddy | – | 54 |
| *Man-made fibres:* | | |
| Acrylics | 28 | 20 |
| Polyesters | 27 | 3 |
| Polyamides | 11 | 8 |
| Cellulosics | – | 30 |
| TOTALS | 329 | 285 |

* Including 43 m lb imported as scoured wool and 25 m lb scoured by worsted operators.

The wider range of raw materials used in the woollen system is evident, together with the predominance of merino wools on the worsted system. Of the 28 million lb of acrylics used on the worsted system, the bulk is used in hosiery and hand-knitting yarns; the 27 million lb input of polyesters is used mainly in wool/polyester worsted fabrics.

Overall consumption of animal fibres has fallen steadily over the past five years by about 5 per cent per year. Consumption of man-made fibres has risen by about 8 per cent per year over the same period.

### 1.3 Combed top production

This production area includes all processes on the worsted system from the reception of the baled wool at the mill to the final despatch of combed tops. The basic sequence of processes is as listed below. Although the sequence may be modified to provide repetitions of certain of the intermediate processing stages, such as gilling or backwashing, the basic sequence of processes is: sorting, scouring, preparer gilling, carding, backwashing, gilling, first combing, and finisher gilling. Of these, the dominant processes are scouring, carding and combing.

Table 1.2 below gives details of the quantity and age of plant, output, and method of operation used at present in these three activities. The information on plant numbers, ages and average hours worked has been largely derived from the questionnaires circulated to the industry, taking into account the standardised WIBS data.

Table 1.2 – Plant used in top production

| Process | Number of sets | *Percentages installed in different periods* | | | *Present output (m lb per year)* | *Average hours worked per week* | *Average production unit (m lb per year)* |
|---|---|---|---|---|---|---|---|
| | | *Before 1939* | *1939 to 1960* | *After 1960* | | | |
| Scouring | 110 | 60 | 32 | 8 | 268 | 80 | 3·0 |
| Carding | 800 | 62 | 34 | 4 | 243 | 90 | 3·8 |
| Noble combing | 840 | 57 | 37 | 6 | 183 | | |
| French combing | 620 | 9 | 46 | 45 | 43 | | |
| Tow conversion | 113 | – | 46 | 54 | 55 | 120 | 5·0 |

The process of sorting is largely manual, and the costs involved vary considerably, depending on the country of origin of the raw material. The use of a greater proportion of South American wool in the United Kingdom has tended to modify the sorting requirements of individual mills, although as the rate of change of source of supply is relatively slow, the overall effect on sorting within the industry has been relatively slight. Being a labour-intensive process, sorting is normally carried out economically on a single-shift basis.

In raw wool scouring, a large proportion of the existing harrow-type plant is over thirty years old, and in the light of current developments, replacement plant should be of a modified type. Development of equipment such as the Aqueous Jet or the improved scouring set developed by the Wool Industries Research Association (WIRA) is being actively pursued at the present time; these reduce the processing cost and simplify the later processing required, especially carding, to produce a given product.

The output of the industry's worsted cards (which is less than that of the worsted scouring sets due to the supply of some 25 million lb of scoured wool to the woollen system) is provided by plant which is of similar age to the scouring sets. Although no major new developments are evident at the moment, the trend to the use of Continental, rather than

Bradford, units with wider beds has increased in recent years, although the data given in Table 1.2 shows a very small degree of worsted card replacement since 1960.

The industry has traditionally produced Noble-combed tops and oil-spun yarns which, it has been claimed, produce a finer handle and a more even-looking worsted cloth which is identifiably British. There has, however, been a marked trend towards the replacement of obsolete Noble combs by French combs in the last few years, due partly to increasing home demand for dry-spun yarns, and also due to the overwhelming proportion of the top export market being solely for dry-combed tops. Table 1.2 shows that 45 per cent of French combs are less than eight years old, compared with only 6 per cent of Noble combs.

The question of the relative merits of dry and oil tops is one which has not been fully resolved by the industry at present, and various authorities would claim specific advantages for each system. From Table 1.2 it is evident that whilst some 60 per cent of the Noble combs in the industry were purchased before the last World War, almost half the French combs have been purchased in the last ten years. In comparing these figures, it must be borne in mind that whereas there has been relatively little basic development of the Noble comb in the last twenty years, and that many of the combs purchased before 1939 have been maintained in first-class order by component replacement and renewal, the French comb has undergone considerable improvement both in terms of operating speed and lower noil production. It has been surmised that the Noble comb is virtually fully-developed, whereas the French comb still has a fair measure of development potential, and this is one of the reasons why the latter has been favoured by the more recently-established textile industries in other parts of the world. A second reason is that it is a more pleasant machine to mind, a factor of importance when labour is scarce.

The hours worked by the industry in these various process areas vary from some 40 to 140 hours per week, although the weighted average is between 80 and 90 per week, as shown in Table 1.2. The establishment size also varies widely, from an output of some 0·2 million lb per year for the smallest scouring units (usually associated with combers) up to the largest scouring and combing establishment which produces about 8 million lb per year. Weighted average production per establishment is 3 million lb for scouring and 3·8 million lb for combing.

### 1.4 Tow-to-top conversion

Tow-to-top conversion is carried out on all types of man-made fibres, although the bulk of the output is at present accounted for by acrylic fibres (some 28 million lb per year). The remainder is predominantly polyester, for use largely in wool polyester worsted woven cloth.

The actual conversion process is relatively capital-intensive, and although some developments have occurred in the last five years, basic plant types are well-established. Table 1.2 shows the plant installed and current operating methods. The majority of the plant at present in use is concentrated in production units with outputs of several million lb per year, which are worked on a multi-shift basis, the average being some 120 hours per week.

### 1.5 Worsted spinning

This process area includes drawing, spinning, twisting and package winding of worsted yarns, and thus represents all production activity from the reception of tops to the despatch of finished yarn. The processes may be considered as part of an oil or dry-spun yarn system, and the dry system (usually Continental or American drawing followed by ring spinning) has tended to increase recently in the light of changing market demands.

Table 1.3 gives details of the major plant types used in the processes of drawing and spinning. No detailed analysis of twisting and winding plant has been carried out, it being assumed that the twisting and winding capacity would be broadly matched to the relevant spinning plant. In drawing, the traditional Bradford drawing sets are no longer being installed, and some 60 per cent of such sets in operation are at least twenty years old. A number of the older Continental and Bradford units have been modified to incorporate additional devices such as Raper Autolevellers, although these modified sets represent only some 6 per cent of the total drawing capacity of the industry. The more recent installations have been of new Bradford sets for oil-spun material, and new Continental, American, and Heavy Roving units for dry-spun material. These newer types account for some 50 per cent of the total capacity at present installed, the larger part of these having been purchased in the last five years.

Table 1.3 – Plant used in worsted spinning

| *Process* | *Number of sets* | *Percentages installed in different periods* | | | *Present output (m lb per year)* | *Average hours worked per week* | *Average production unit (m lb per year)* |
|---|---|---|---|---|---|---|---|
| | | *Before 1950* | *1950 to 1960* | *After 1960* | | | |
| *Drawing:* | | | | | | | |
| Conventional Bradford | 1,400 | 60 | 40 | – | | | |
| Modified old Continental or Bradford | 200 | 50 | 40 | 10 | | | |
| New Bradford | 600 | – | 40 | 60 | | | |
| New Continental American and heavy roving | 800 | – | 30 | 70 | | | |
| *Spinning:* | *Million spindles* | | | | | | |
| Cap | 1·0 | 90 | 10 | – | 49 | 50 | 1·0 |
| Ring | 0·6 | 28 | 27 | 45 | 67 | 70 | 2·0 |
| Flyer | 0·4 | 45 | 35 | 20 | 84 | 60 | 2·0 |
| Mule | 0·02 | 85 | 15 | – | 1 | 50 | 0·5 |

Of the four types of worsted spindle, mule spinning represents less than 1 per cent of sectoral production, and apart from certain highly-specialised products forms an insignificant part of its activity. The cap spindles, which are primarily used for the finer worsted weaving yarns, produce some 25 per cent of the total worsted yarn output, almost all these frames being over twenty years old. The work performed by WIRA in the development of the Autospinner could well have a significant influence on the future of cap spinning, as the conversion of normal cap frames virtually halves the labour requirement by eliminating the need for piecening. However, at the present time the additional advantages of the most modern dry Continental drawing and double-apron ring spinning systems make this latter type of process attractive for all but the finest worsted weaving yarns. Ring spinning has been undoubtedly the major growth area in the past twenty years, and the development of improved spinning frames of this type is continuing, particularly in the United States. Modified ring spinning can be applied to yarns for all types of end use, oil or dry, although the majority of the ring spindles at present installed are used in the production of hosiery yarns.

Flyer spinning, which currently accounts for a larger part of the total worsted yarn output than any other single spinning system, is on the decline in terms of the installation of new equipment. Apart from a number of advantages in terms of feel and loft, which make a flyer spun yarn especially attractive for hand knitting applications, it seems likely that the modern ring spinning systems will prove more attractive in the future, and thus the steady decline of flyer spinning may well continue. Some claims are at present being made with regard to certain modified high-loft ring spinning systems for the production of hand knitting yarns, and although these appear to be viewed with some suspicion by the UK industry, it may well be that this type of development will increase the rate of change from flyer to ring spinning even in the multifold bulk yarn area.

### 1.6 Production of woollen yarns

The whole of the processing activity involved in the production of woollen yarns from raw material is included in this particular article, to allow for the fact that there is no natural break after the initial raw material preparation before the commencement of the sliver reduction prior to the actual spinning processes. The initial processes vary with the classes of raw material used, the three main raw material types, raw wool, man-made fibre, and processed waste material, being drawn together prior to the blending stage after selective preliminary processing.

Before blending, the raw wool would normally be sorted, scoured and perhaps carbonised; the recirculated waste material would be sorted, pulled and garnetted and possibly carbonised, whilst the man-made fibre supplied in the staple form would require no additional processing prior to spinning. After blending, the fibre mixtures are carded before spinning, twisting and winding. Some 25 million lb of scoured wool is not prepared on the woollen system, but is transferred from the early worsted material preparation stream, as shown on Figure 1.3, and in addition some 16 million lb of fibre, largely man-made, is used on the semi-worsted system, as discussed in the next article.

Table 1.4 – Plant used in woollen yarn production

| *Process* | *Number of sets* | *Percentages installed in different periods* | | | *Present output (m lb per year)* | *Average hours worked per week* | *Average production unit (m lb per year)* |
|---|---|---|---|---|---|---|---|
| | | *Before 1939* | *1939 to 1950* | *After 1950* | | | |
| *Scouring:* | | | | | | | |
| Commission | 21 | 52 | 19 | 29 | 39 | 80 | 4·0 |
| Others | 64 | 57 | 36 | 7 | 53 | 50 | Integrated |
| *Carding:* | | *Before 1950* | *1950 to 1960* | *After 1960* | | | |
| Weaving yarn | 2,500 | 77 | 14 | 9 | 171 | 60 | 1·0 |
| Carpet yarn | 130 | 51 | 25 | 24 | 46 | 80 | 2·5 |
| *Spinning:* | *Million spindles* | | | | | | |
| Mule | 1·2 | 72 | 22 | 6 | 134 | 60 | As for carding |
| Ring | 0·14 | 6 | 22 | 72 | 83 | | |

Table 1.4 gives details of the existing plant in the major processes of scouring, carding, and spinning, together with typical outputs and operating practice. The majority of the early-processing plant is over thirty years old, and the low level of capital investment in new plant bears out the fact that there have been relatively few developments of the basic machines. The improvements in scouring methods mentioned in

Article 1.3 will have an influence on the future of woollen material scouring; however, it is likely that these will lag behind the developments in the worsted sector, as part of their advantage is achieved only during combing.

In carding there are two basic types, the traditional Bradford and the Continental cards, although many actual units are in effect a combination of the two. The tendency in recent years has been to favour the higher-speed Continental units, especially for carpet wools, and there has been a considerably greater level of investment in cards of this type in the last twenty years, rather than in cards for weaving yarn material, for which there has been relatively little investment since 1950.

In spinning, the older mule system still accounts for some 60 per cent of woollen yarn output, although the level of investment in mules in the last ten years has been very low. The more recently-developed ring system, in which there has been a growing level of investment in recent years, provides advantages for all but the finer yarns in terms of processing speed, economy, and package size. Various types of twisting and winding are used, regardless of the spinning method, and although no detailed assessment of existing twisting and winding equipment has been carried out, there is currently a fair level of interest in new and more sophisticated methods, largely to take advantage of the increased package sizes resulting from improved methods of ring-frame spinning.

In the initial processes of preparation of the raw wool, a significant part (45 per cent of output) is carried out on a commission basis. Commission operators work an average of some 80 hours per week; this contrasts with a considerably lower level of machine usage for the non-commission operators, the present average being around 50 hours per week. The commission scouring units vary widely in size, and although the smallest only produce around 1 million lb per year each, some operators produce up to eight times this amount.

All processes of carding and spinning are currently operated at an average level of some 60 hours per week, with the exception of the carding of material for carpet yarns. In this field, the much larger batch size, and the fact that the plant is more modern and therefore less fully-depreciated, necessitates operation at a higher level, the current average being around 80 hours per week. The integrated carpet yarn production units tend to be larger than those for weaving and other yarns, and there are few small establishments producing material for carpets. The average size of integrated woollen yarn producing establishment at present varies from 1 to 2·5 million lb per year output, although the range varies from 0·05 to some 4 million lb per year.

## 1.7 Production of semi-worsted yarn

The recent rapid growth in the market for carpet yarns has led to the development of a number of systems of yarn production which are suited to the manufacture of these particular grades of product. Of these, one of the most significant is the semi-worsted or modified flax-spinning system, which is in effect a shortened form of worsted spinning which includes blending, carding, gilling and ring spinning with apron-drafting, followed by twisting and winding. The process takes material blended by normal woollen system techniques, and, as shown on Figure 1.3, currently accounts for some 16 million lb of blended fibre, over 90 per cent of which is man-made.

Table 1.5 summarises the plant and operating practices in the wool textile industry.

The majority of semi-worsted cards have been installed in the last ten years, although there are a number of older units which have been modified to cope with the higher outputs and limited regularity requirements of the carpet yarn sliver. At present these units are operated at around 100 hours per week. The sliver-yarn spinning units, which are a particular type of modified ring frame, have again all been installed relatively recently, and virtually all of the plant operating in this particular sector has been specially designed for the production of

Table 1.5 – Plant used in semi-worsted yarn production

| | | *Percentages installed in different periods* | | | | | |
|---|---|---|---|---|---|---|---|
| *Process* | *Number of sets* | *Before 1939* | *1939 to 1950* | *After 1950* | *Present output (m lb per year)* | *Average hours worked per week* | *Average production unit (m lb per year)* |
| Carding | 42 | – | – | 100 | 15 | 100 | 2·0 |
| Sliver-yarn spinning | *Spindles* 9,100 | – | – | 100 | 15 | 60 | |

carpet yarn. The present level of operation averages 60 hours per week, the carding and spinning operations normally being carried out in an integrated unit; the average present output is some 2 million lb per year, with the range being 0·2 to 3·4 million lb per year.

## 1.8 Weaving and finishing

The weaving sector has been taken to include all processes from the delivery of yarn on package to the despatch of the mended cloth for finishing. The yarn preparation processes which precede actual manufacture will vary depending on the type of weaving to be used: for instance, pirn-winding will be required only for conventional looms, whilst warping and beaming will be necessary for all methods of cloth production. Re-winding from the standard cone or cheese will often be required in place of the pirn winding when pirnless weaving machines are used. In the analysis of types of weaving process, the term 'pirnless weaving machine' covers all types of non-conventional loom, most of which employ modified weft projection devices such as rapiers, bullets or fluid jets.

In worsted weaving, the majority of the cloth is at present produced on non- or semi-automatic looms of conventional form. As Table 1.6 indicates, many of these units are old, over 60 per cent being installed before 1939. Almost all specialised cloths, and those for which the demand is for small batches (i.e. less than about three cuts per warp) are produced on looms of this type. Automatic looms, most of which were installed between 1940 and 1954, produce about 40 per cent of the worsted cloth woven at present, the majority of this material finding its way into the bulk trade, which, in general, uses coarser yarns than the specialised grades of product manufactured on the non- or semi-automatic looms. The statistics for existing plant given in Table 1.6 indicate the time at which looms of a particular type came into operation; the fact that a number of automatic looms have been converted from semi-automatic means that, although automatic looms appear to have been installed more recently than the non- and semi-automatic units, this may not be strictly true.

All the conventional looms are operated at an average level of some 50 hours per week, although the variation throughout the industry is very wide. The production units also vary widely in size, with an average output of some 0·4 million lb per year. At present the worsted cloth produced on pirnless weaving machines is limited to the extreme bulk end of the trade, and only accounts for some 8 per cent of the total output. These machines tend to be concentrated in larger units than the conventional looms (typically around 1 million lb per year output), and are operated at a higher number of hours per week, the average being 80.

The finishing of the worsted cloth is done either by the weaving establishment or by commission finishers. In general, the plant used by commission finishers tends to be newer, and to be operated more hours per week, in larger individual process units, than that owned by the integrated establishments. The commission finishers handle about 30 per cent of total woven cloth production.

Table 1.6 – Plant used in weaving and finishing

| *Process* | *Number of looms* | *Percentages installed in different periods* | | | *Present output (m lb per year)* | *Average hours worked per week* | *Average production unit (m lb per year)* |
|---|---|---|---|---|---|---|---|
| | | *Before 1939* | *1939 to 1955* | *After 1955* | | | |
| *Worsted weaving:* | | | | | | | |
| Non-automatic | 6,300 | 60 | 23 | 17 | 44 | | |
| Semi-automatic | 2,500 | 69 | 17 | 14 | | 50 | 0·4 |
| Automatic | 5,500 | 36 | 51 | 13 | 30 | | |
| Pirnless | 300 | – | – | 100 | 6 | 80 | 1·0 |
| *Woollen weaving:* | | | | | | | |
| Non-automatic | 9,200 | 47 | 21 | 32 | 84 | | |
| Semi-automatic | 3,500 | 21 | 40 | 39 | | 50 | 0.5 |
| Automatic | 7,400 | 9 | 58 | 33 | 46 | | |
| Pirnless | 400 | – | – | 100 | 8 | 80 | 1·0 |
| *Finishing:* | | | | | | | |
| Integrated worsted | – | 65 | 23 | 12 | 38 | 44 | 0·6 |
| Integrated woollen | – | 54 | 31 | 15 | 116 | 48 | 0·8 |
| Commission | – | 41 | 36 | 23 | 64 | 60 | 2·5 |

Between the major processes of weaving and finishing the cloth is burled, inspected and mended. These labour-intensive processes are often performed on commission by outworkers, such commission operation covering about 20 per cent of total cloth production.

The looms for woollen cloth also shown in Table 1.6 are sub-divided in the same manner as for worsted cloth, there being a tendency for a greater proportion of woollen cloth output to be produced on the non- and semi-automatic looms. The installation of conventional looms in the woollen weaving sector has tended to be more recent than in worsted weaving, and over 35 per cent of all the conventional looms were installed after 1955. The conventional looms are again operated at an average of some 50 hours per week in establishments averaging 0·5 million lb per year output, although both the levels of operation and the size of individual establishment vary widely with the type of product and locality of the establishment. Pirnless weaving machines again account for some 8 per cent of present woollen cloth output, and these machines are again concentrated into units of about 1 million lb per year output, operated at around 80 hours per week. The finishing of the woollen cloth is very largely carried out by the manufacturers themselves. As before, the plant installed by the commission operators tends to be rather more modern than that employed by the integrated woollen companies.

### 1.9 Production of other non-woven fabrics

At present, there is little production within the industry of non-woven fabrics, although there are a number of areas in which development work, or production on a small scale, is being carried out, and in at least some of these areas there is potential for a greater level of interest in the future. The main processes are described in turn below:

*Adhesive bonding*

The use of adhesive bonding techniques, especially for fabrics which are not visible in the final made-up garment, such as interlinings, has grown markedly in the last few years, although the majority of this activity has been carried on by firms outside the industry. In the main, these bonded fabrics are produced by laying some form of adhesive coating onto a light, cheap, woven cloth, which acts as a support for the bonding material. As the requirements of the fabric backing are purely structural, the need is for the cheapest possible cloth, and those woven interlining backings still produced within the industry have been manufactured from minimum-cost raw materials. The main competition for interlining production has come from a few companies outside the industry, who have developed surface-fusing techniques and have been able to cover the cost of a considerable amount of development work by maintaining the selling price of their interlinings at a level which is competitive with the equivalent woven fabrics. It, therefore, seems unlikely that the wool textile industry is in a position to recapture a significant part of this lost interlining market, without a considerable level of investment in research and development.

*Needle punching*

This process consists of drawing fibres from a laminated array of web material and looping them through adjacent layers to form a fabric; reinforcement by a woven scrim or warp threads is often incorporated. Although the process has numerous applications outside the field of wool textiles, the only significant product within the industry is needle punched blankets, which form about 25 per cent of total blanket production.

*Stitch bonding*

Although there has been in recent years a great deal of activity in the production of stitch bonded fabrics, mainly in eastern European countries, there seems little potential market in the UK for products of this type. This assumption is borne out by the fact that there has been, to date, little exporting of these fabrics outside their countries of origin (particularly Russia, Czechoslovakia, Poland and East Germany), despite the fact that installed plant in these countries is reputed to be producing some 50 million lb per year of medium-weight fabric.

*Lamination*

The main characteristics which can be achieved by lamination include increased fabric strength and rigidity, improved wear resistance and stability, increased weight or bulk, and the achievement of various surface effects or higher levels of opacity for a given fabric type. Development has been concentrated on the lamination of single-jersey knitted fabrics, the lamination being achieved either by 'coin' or foam bonding, and either technique can be applied to lightweight woven cloths. The plant required for lamination is relatively simple, and is currently operated either by knitting companies or small specialist bonding operators. The application of these techniques is well advanced in the United States, and present trends in this country point to a considerable increase in the quantity of laminated material of all types being produced in the future.

## 1.10 Dyeing

Dyeing can be carried out on material in the form of loose stock, tops, yarn, or fabric. The main product types associated with the various processes are outlined below:

| | *Worsted products* | *Woollen products* |
|---|---|---|
| Loose stock dyeing | – | Fancy woven cloths and some carpet yarn |
| Top dyeing | Woven cloth, some hand knitting yarn, hosiery yarn | – |
| Hank yarn dyeing | Hand knitting yarn | Carpet yarns |
| Package yarn dyeing | Hosiery yarn | – |
| Piece dyeing | Bulk-woven plain cloths | Blankets and plain cloths |

All types of dyeing process may be considered as being either normal-temperature or high-temperature activities. Traditionally, the colouration of wool and hair was carried out at temperatures below 100°C, this being the point above which fibre damage could occur unless special precautions were taken. The increasing use of man-made fibres, many of which can only satisfactorily be dyed at temperatures in excess of 100°C, has led to the development of high-temperature plant. Many of the more modern high-temperature units can be operated at either normal or high temperature, and can thus handle both animal and man-made fibres with modified machine settings. Table 1.7 gives details of existing plant for the various types of dyeing operation, for both normal and high-temperature equipment, and from this it is clear that the majority of the high-temperature plant installed in recent years has been in the top and package yarn dyeing areas, there being a trend for a significant increase in the installation of new high-temperature package yarn dyeing units in the last five years.

Table 1.7 – Plant used in dyeing

| *Dyeing process* | *Percentages installed in different periods* | | | *Present output (m lb per year)* | | *Average hours worked per week* | *Average production unit (m lb per year)* |
|---|---|---|---|---|---|---|---|
| | *Before 1950* | *1950 to 1960* | *After 1960* | *Worsted* | *Woollen* | | |
| *Loose-stock:* | | | | | | | |
| Normal | 25 | 42 | 29 | – | 114 | 50 | 0·7 |
| High temperature | – | – | 4 | | | | |
| *Top:* | | | | | | | |
| Normal | 14 | 40 | 26 | 113 | – | 50 | 2·5 |
| High temperature | – | 10 | 10 | | | | |
| *Hank yarn:* | | | | | | | |
| Normal | 25 | 49 | 26 | 43 | 51 | 50 | 1·2 |
| High temperature | – | – | – | | | | |
| *Package yarn:* | | | | | | | |
| Normal | 19 | 48 | 6 | 35 | 7 | 50 | |
| High temperature | – | 10 | 17 | | | | |
| *Piece:* | | | | | | | |
| Normal | 26 | 40 | 29 | 17 | 43 | 70 | 1·3 |
| High temperature | – | 3 | 2 | | | | |

For both the worsted and woollen systems, at least 50 per cent of material is dyed before the commencement of spinning. This fact has led to the holding of stocks at early stages of processing, and has resulted in a relatively lengthy period of time elapsing after a customer has designated his colour requirements, before the yarn or final fabric can be supplied. Current interest in improved methods of package yarn dyeing and piece dyeing, such as differential dyeing techniques, largely results from the need to improve customer service, rather than from the requirement for better quality or lower-cost dyeing.

No detailed analysis has been made of the proportion of products dyed on commission as opposed to that dyed in an integrated establishment, although of course commission operators are active in all classes of dyeing. The questionnaire results point to relatively little variation between the commission and integrated operators in terms of plant and present methods of operation, although it is evident that there is a wide variation between the best and worst operators of each type.

The current level of working the existing plant is around 50 hours per week for all processes apart from piece dyeing, for which the average is around 70 hours per week. This is partly accounted for by the fact that some piece dyers handle a significant quantity of knitted fabric produced outside the industry.

Typical sizes of dyeing units within the industry vary widely, although the top-dyeing establishments are significantly larger than other operators. There are a number of small loose-stock dyers in the woollen trade, resulting in a smaller average production unit size for this type of dyer.

### 1.11 Stocks and work in progress

There are four basic purposes for the holding of material of various types by a company, all of which constitute the total stocks. The first is to provide protection against fluctuations in raw material prices, whereby the additional cost of holding the material as stock is balanced against the risk of undue future price rises. The extent to which this is carried out will depend upon the confidence of the buyer or his agent and the level to which buying on the general futures market can achieve the same end result. At the end of 1967, raw wool stocks stood at 180 million lb, or about six months' requirements.

The second cause of stocks is work in progress. This is the material actually being worked on at any given time, and is strictly limited to that material which is inaccessible for other purposes, due to the fact that it is actually being worked on, or is contained within first-line machine storage. The level of material which constitutes work in progress will clearly vary with such factors as package size, process time, and size of finished batch within which sub-division is not permitted.

The third cause is buffer production stocks. These cover the material which is held either prior to the commencement of actual processing, to maintain smoother flow by ensuring that adequate raw material is always available for the next setting-up operation, or immediately following a process to allow for the complete filling of a suitable transportation container, such as skep or box for yarn packages and so on. This class of stock is often included as a part of the work in progress.

The fourth cause is the necessity to provide customer service. The level of stock held in final product form will depend entirely on the class of service required, such as rapid stock service, stock service with reasonable time delay, and the like. This class of stock can occur at intermediate points in the production cycle, in which case the material held is in the part-finished form, or could be stocks of finished yarn or fabric either awaiting delivery, or awaiting customer instructions.

A measure of the significance of the stocks held by the industry as a whole can be gained from the fact that these are currently running at some £190 million, representing about 45 per cent of the total assets of the industry. The breakdown is approximately as follows:

| | *Quantity* | *Value* |
|---|---|---|
| Raw wool | 180 m lb | £60 m |
| Tops | 45 m lb | £20 m |
| Yarns and cloths | 100 m lb | £110 m |
| TOTALS | 325 m lb | £190 m |

The first point at which stocks may be held within the industry is in the raw wool form. The reasons for the holding of stock will depend on whether or not the operator concerned is acting as a merchant or raw wool processor; in the former case the stocks will be held in order to provide a reasonable customer service for a range of wools, whilst the processor will only hold stocks as a safeguard against lack of supply at some future date, in addition to his minimum stock requirements for smooth production flow. The level of stocks held will depend on the time of year, which is closely linked to the availability of raw wool from the various producer countries, and the general state of the market. On the woollen system some raw material may be held in the scoured state, rather than as greasy wool.

In the worsted field, the next point at which significant stocks are held is in the top state, the material being either dyed or white. As in the case of raw wool, the level of stocks, in addition to those required for optimised transport, will depend upon the time of year and the general state of the market; also a proportion of the tops held will be awaiting final instructions from the customer. In addition, tops may be held in order to provide a direct customer service. The quantity of tops held (45 million lb at the end of 1967) is likely to vary significantly depending on the seasonality of the trade involved, although the increased interest in yarn dyeing, especially on package, at the present time, is tending to reduce the level of tops held awaiting final instruction. On the woollen and semi-worsted systems, no stocks are held in the intermediate stages between raw material and yarn stage equivalent to the top on the worsted system.

Yarn stocks are held for reasons already discussed for tops, the relative proportions of the total stock held depending to a much greater extent on the relative level of activity of the main customer sectors of the industry, which are woollen and worsted weaving, hosiery, carpet manufacture, and direct yarn sales. The point at which weaving yarn on beam is held will depend on the responsibility for beaming, and whether this process is carried out by the spinner or manufacturer. In the generalised division of processes within the industry, it has been assumed that warping is normally carried out by the manufacturer, although a number of commission manufacturers purchase yarn on beam rather than carrying out the process themselves. Even in this case, however, a stock of warped beams would need to be held by the manufacturer.

In an assessment of the present situation with regard to stocks in the industry, the unique position of commission operators is of relevance. Although independent commission combers no longer exist, a significant amount of commission combing, spinning and weaving is still carried out, and the majority of the non-integrated dyers and finishers operate on a commission basis. The commission operator's strength lies partly in his avoidance of all costs of holding stock, with the result that he can invest all his available capital and management effort in the operation of his plant without having to balance this against a fluctuating commodity market.

Particularly on the worsted system, stock levels throughout the processing sequence are increased considerably by the prevalence of weak selling. This is especially so between the manufacturers and their outside customers. The 'on-call' system, whereby the manufacturer holds finished goods (without recompense) until taken up at the customer's convenience, costs the industry an estimated £1 million per year, and elsewhere in the industry considerable stocks are held awaiting customer's delivery or colouring instructions. Such enforced stockholding cannot be improved by better administrative control of stock levels; a different fundamental conception of marketing is necessary.

## 1.12 Capacities of the industry

For the purposes of the study two definitions of sector capacity have been used. The first, termed 'present capacity', relates to the industry as it stands today, in terms of plant and method of operation, and is therefore that production which would be achievable if all plant were in operation on the current average hours per week. The second definition is that production which could be achieved by operating all existing plant 'round the clock', assuming that labour would be available; figures are based on 160 working hours per week. This latter concept, termed 'ultimate' capacity, indicates that size of market which could be potentially supplied by the present industry without incurring additional capital expenditure.

Table 1.8 shows the present and ultimate capacities of the existing plant in the various sectors of the industry, using the definitions given above. For each sector, the capacity has been derived with regard to one or more dominant processes, as it was found that in almost all cases the capacities of plant other than that relating to these major processes would match the potential output of these major items of production equipment. Thus, for example, in worsted spinning no reference has been made to the capacities of the drawing sets or twisting

**Table 1.8 – Capacity of existing plant**

| *Sector and process* | *Present hours worked per week* | *Present production (m lb per year)* | *Capacity on present hours* | | *Capacity on 160 hours per week* | |
|---|---|---|---|---|---|---|
| | | | *m lb a year* | *Per cent excess* | *m lb a year* | *Per cent excess* |
| *Combed-top production:* | | | | | | |
| Scouring | 80 | 268 | 308 | 15 | 616 | 130 |
| Carding | 90 | 243 | 284 | 17 | 504 | 108 |
| Noble combing | 90 | 183 | 201 | 10 | 360 | 97 |
| French combing | 90 | 43 | 47 | 10 | 85 | 98 |
| *Tow-to-top conversion:* | 120 | 55 | 57 | 4 | 76 | 37 |
| *Worsted spinning:* | | | | | | |
| Cap | 50 | 49 | 58 | 18 | 186 | 280 |
| Ring | 70 | 67 | 80 | 19 | 185 | 176 |
| Flyer | 60 | 84 | 96 | 14 | 256 | 204 |
| Mule | 50 | 1 | 1 | 17 | 4 | 300 |
| *Woollen-yarn production:* | | | | | | |
| Scouring | 60 | 92 | 110 | 20 | 286 | 242 |
| Carding | 70 | 217 | 228 | 5 | 525 | 142 |
| Mule spinning | 60 | 134 | 158 | 18 | 421 | 214 |
| Ring spinning | 60 | 83 | 98 | 18 | 254 | 206 |
| *Semi-worsted yarns* | | | | | | |
| Carding | 100 | 15 | 18 | 20 | 29 | 93 |
| Spinning | 60 | 15 | 18 | 20 | 48 | 220 |
| *Worsted weaving:* | | | | | | |
| Non-automatic | 50 | 44 | 54 | 23 | 172 | 291 |
| Semi-automatic | 50 | | | | | |
| Automatic | 50 | 30 | 34 | 13 | 107 | 256 |
| Pirnless | 80 | 6 | 6 | low | 12 | 100 |
| *Woollen weaving:* | | | | | | |
| Non-automatic | 50 | 84 | 106 | 26 | 340 | 305 |
| Semi-automatic | 50 | | | | | |
| Automatic | 50 | 46 | 53 | 15 | 170 | 270 |
| Pirnless | 80 | 8 | 8 | low | 16 | 100 |
| *Finishing:* | | | | | | |
| Integrated worsted | 44 | 38 | 49 | 29 | 182 | 379 |
| Integrated woollen | 48 | 116 | 139 | 20 | 460 | 296 |
| Commission | 60 | 64 | 76 | 19 | 203 | 217 |
| *Dyeing:* | | | | | | |
| Loose stock | 50 | 114 | 160 | 40 | 510 | 347 |
| Top | 50 | 113 | 164 | 45 | 528 | 367 |
| Hank-yarn | 50 | 94 | 103 | 10 | 330 | 251 |
| Package yarn | 50 | 42 | 46 | 10 | 148 | 252 |
| Piece | 70 | 60 | 83 | 38 | 190 | 216 |

frames, as these are broadly matched to the potential throughput of the spinning frames for which relevant capacity details have been quoted.

The current percentage of excess plant given in Table 1.8 is indicative of the idle equipment existing in a sector. There are several possible reasons for its existence:

(a) the market will not absorb the potential production;

(b) insufficient labour is available to operate the machinery;

(c) the machinery is out-dated but is retained for use in peak demand periods;

(d) the plant is specialised and is kept for times when the market demands its particular characteristics: melange-printing equipment is an example of this.

In the case of combing, the figure of 10 per cent excess plant does not seem unduly great. It would be surprising if the figure were higher, as the data takes into account the fact that two combing firms ceased operations during the early part of 1968. Similarly, there is no great excess of tow-to-top converters at present. Sectors with apparent overcapacity are dyeing (except yarn dyeing) and finishing, non- and semi- automatic weaving, semi-worsted processing, and virtually all types of spinning. In dyeing and finishing particularly, however, a measure of overcapacity is necessary to provide flexibility between processes, and also to give the degree of customer service required of commission operators. Furthermore, many dyers and finishers also handle products of other industries (cotton, hosiery, etc.) so that their capacity does not relate solely to the wool textile industry.

Whilst it would be unreasonable for the entire industry to be operating consistently with only a few per cent overcapacity, the fact that many sectors have between fifteen and twenty per cent implies that there is normally some capacity waiting to be filled with orders. The initiative in the marketing situation therefore lies with the customer (except for specialised products made by few firms) and this must contribute to the overall weakness in marketing exhibited by the industry.

# Chapter 2 Present manpower and management

## 2.1 The manpower of the industry

This article is concerned with analysing the present manpower statistics and recent trends in the industry, so as to reveal some present problems regarding personnel and to provide basic data for assessing the effects of changes in production processes. For this purpose the statistics have been summarised to show the following aspects:

Trends in employment of production personnel in the principal sectors;
Functional analysis (production, management, clerical, etc.);
Distribution of men and women;
Age distribution of production employees of both sexes;
Employment of immigrants;
Distribution of employment between the main geographic regions.

Statistical information has been obtained from the Department of Employment (DEP) and Productivity and from WIBS. These sources are sufficiently in agreement for this purpose, the main objective being to identify past and current trends. Where it is necessary to quote actual numbers and the figures collected by each source differ, WIBS figures have been used.

Figure 2.1 shows the changes in production personnel in each of the major sectors. The total number of personnel and the number of production personnel have both fallen by about 30 per cent in the last ten years. Almost all of this decrease has occurred in the period 1961 to 1967, the average annual reduction over this period being about 4 per cent.

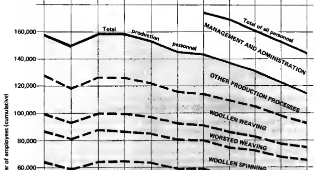


FIGURE 2.1 – RECENT EMPLOYMENT TRENDS

Table 2.1 shows the industry's present manpower analysed by sector and sex. The proportion of men to women may be summarised as follows:

| | *Men (per cent)* | *Women (per cent)* |
|---|---|---|
| Combing | 91·5 | 8·5 |
| Worsted spinning | 32·9 | 67·1 |
| Woollen spinning | 62·0 | 38·0 |
| Manufacturing | 34·8 | 65·2 |
| Dyeing and finishing | 86·5 | 13·5 |
| Administration | 64·0 | 36·0 |
| The industry | 51·0 | 49·0 |

Table 2.1 – Functional analysis of the manpower

| | *Present number* | | |
|---|---|---|---|
| *Personnel* | *Men* | *Women* | *Total* |
| *Administration* | | | |
| Management, sales and design | 6,800 | 500 | 7,300 |
| Production control, maintenance and transport | 6,900 | 500 | 7,400 |
| Clerical | 2,800 | 6,000 | 8,800 |
| Canteens and cleaning | 1,600 | 3,000 | 4,600 |
| SUB-TOTALS | 18,100 | 10,000 | 28,100 |
| *Production* | | | |
| Combing | 9,500 | 1,200 | 10,700 |
| Worsted spinning | 10,800 | 22,200 | 33,000 |
| Woollen yarn production | 14,700 | 8,500 | 23,200 |
| Weaving | 12,900 | 25,900 | 38,800 |
| Dyeing and finishing | 5,800 | 900 | 6,700 |
| Others | 2,800 | 800 | 3,600 |
| TOTALS | 74,600 | 69,500 | 144,100 |

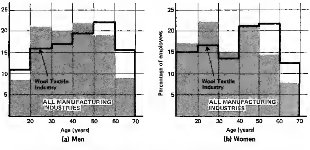
There has been a steady reduction in the proportion of women employed in the industry, from about 54 per cent in 1960 to the 49 per cent quoted above.

In Figure 2.2 the age distribution of men and women in the wool textile industry is compared with corresponding averages for all British manufacturing industry. It is apparent that the industry has succeeded in recruiting young men but that a large number of them has tended to leave after a few years, so that the industry is below average in the important middle age groups. The industry is below average in the employment of women up to the age of 50, but is above the national average in the highest age groups for both men and women. In view of the considerable number of men and women who are now over retiring age, and those who will reach retiring age in the next six years, these figures indicate a recruitment problem before 1975 if demand for labour does not fall proportionately.

The number of immigrant employees has remained almost constant in recent years, although the ratio of immigrants to natives has increased slightly. The present position is given below:

| | *Number* | *Percentage of all employees* |
|---|---|---|
| European immigrants | 3,645 | 2·6 |
| Indians and Pakistanis | 9,813 | 6·8 |
| Other Commonwealth or foreign workers | 1,542 | 1·0 |
| | 15,000 | 10·4 |

Of these 15,000 workers, 12,700 are men.



(a) Men (b) Women

FIGURE 2.2 – AGE DISTRIBUTION OF PRESENT EMPLOYEES

The distribution of manpower in the main geographical regions is as follows:

| *Economic Planning Region* | *Men (per cent)* | *Women (per cent)* | *Total (per cent)* |
|---|---|---|---|
| South-west | 1 | 1 | 2 |
| Yorkshire and Humberside | 37 | 36 | 73 |
| North-west | 3 | 2 | 5 |
| Northern | 2 | 2 | 4 |
| Scotland | 5 | 6 | 11 |
| Others | 3 | 2 | 5 |
| | 51 | 49 | 100 |

Thus Yorkshire and Scotland together account for nearly 85 per cent of employment within the industry, with the proportion of men to women not varying significantly between regions.

### 2.2 Recruitment and turnover of manpower

Accurate statistics on this subject are not available, but the DEP collects information concerning the numbers of engagements and leavers made by companies in sample periods. This information can be grossed up to obtain approximate annual figures, but the variation is such that the grossed up figures can be only approximately correct, and the method of collection causes them to be slightly below the true figures. However, they provide a sufficiently good indication of the overall rate of manpower turnover in companies in the industry. The regional concentration of the industry allows a considerable amount of 'job-hopping' between wool textile companies; labour turnover for the industry as a whole is, therefore, substantially less than the rates quoted, but cannot be estimated factually. It should be borne in mind, however, that all figures of turnover are averaged over total employment although in fact in all industries a much larger proportion of employees remain in the same job than the turnover figures imply.

Comparative grossed-up figures are given overleaf for the wool textile industry and all British manufacturing industry, expressed as percentages of manpower employed:

| | *Wool textile industry* | | *All manufacturing industries* | |
|---|---|---|---|---|
| *Year* | *Engagements (per cent)* | *Leavers (per cent)* | *Engagements (per cent)* | *Leavers (per cent)* |
| 1961 | 40 | 47 | 35 | 35 |
| 1962 | 42 | 50 | 38 | 37 |
| 1963 | 48 | 52 | 35 | 35 |
| 1964 | 46 | 53 | 38 | 37 |
| 1965 | 53 | 57 | 39 | 37 |
| 1966 | 59 | 65 | 42 | 43 |
| 1967 | 50 | 60 | 34 | 39 |
| 1968 | 51 | 50 | 35 | 34 |

Allowing for inaccuracies from year to year, two main conclusions can be drawn from these figures. Firstly, average turnover in the industry is in the region of 50 per cent compared with a national average below 40 per cent; secondly, the turnover rate has been rising in the industry since 1961, whereas the national turnover rate has remained more or less constant. Even allowing for the stability of a large group of employees, this rising trend of turnover is disturbing. The figures have also been analysed to show men and women separately, and it is found that turnover among men in the industry is only slightly lower than among women. This contrasts with the national situation where turnover among men is substantially lower than among women.

Information available about turnover in the different sectors indicates that there is a tendency, especially in combing, for turnover to increase when local unemployment is low, and vice versa. Approximate annual average turnovers are estimated as below:

Combing – 50 to 80 per cent
Worsted spinning – 60 to 75 per cent
Manufacturing – 30 to 35 per cent

Unemployment varies both regionally and locally; for example, in April 1968 the percentage unemployed in Bradford and Keighley was 2·5, while in Halifax and Huddersfield it was 1·0 and 1·1 respectively. The Yorkshire and Humberside region has generally enjoyed slightly lower unemployment than the national average in recent years.

Besides the local unemployment situation, the current state of trade is a fluctuating factor. Most companies try to maintain a steady work load, but temporary or long-term loss of business causes loss of labour, since, with over 80 per cent of the labour force on some form of piecework, production employees tend to move within the industry to companies with full order books.

Concerning recruitment, it has been pointed out that the number of engagements shown above, at over 40 per cent or about 50,000 a year, does not correspond to the number of recruits new to the industry. However, information is available to indicate the number of young people aged 15 to 17 entering the industry. Expressed as a proportion of all employees, these young recruits have amounted to about 2½ per cent of the industry since 1960. Boys entering the industry have generally represented just over 1 per cent of boys entering all British manufacturing industries, with a very slight tendency to decline recently. On the other hand, the number of girls entering the industry declined considerably in 1967 as a proportion of the national figure, particularly in the Yorkshire and Humberside region.

Traditionally, the industry's recruitment is very local, and employees generally are reported to be unwilling to travel far to work, due partly to the extent of employment of women, especially married women. In 1966 the Ministry of Labour estimated that married women represented 30 per cent of all labour employed in the textile industries. Apart from the parochial nature of its recruitment, which causes some inflexibility, the industry experiences difficulty in recruiting the required number and type of employees. The reasons for this are considered more fully in Articles 2.3 and 2.5.

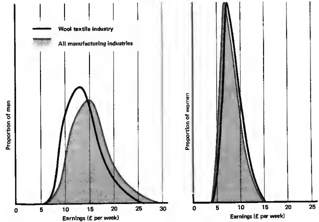
### 2.3 Remuneration and conditions of employment

It is estimated that at least 80 per cent of production employees in the industry enjoy some form of payment by results; of those who are time-rated, some receive an output-related bonus. In considering remuneration, therefore, it is important to use figures of average earnings related to the number of hours worked, rather than negotiated hourly rates. Average hourly earnings in the industry are compared below with the equivalent averages for all manufacturing industry in October 1968:

| | *Wool textile industry* | *All manufacturing industry* | *Difference* |
|---|---|---|---|
| Men | 8/5d | 10/4d | –18 per cent |
| Women (full time) | 5/7d | 5/11d | –5 per cent |
| Women (part time) | 5/4d | 5/7d | –4 per cent |

Average weekly earnings of men in clerical, technical and administrative jobs in the industry in October 1968 were £29 19 1d compared with £30 0 9d for all manufacturing industry. Estimates provided by the DEP of average weekly earnings by men in the Yorkshire and Humberside region in October 1968 show the wool textile industry about 5 per cent below the average for other industries in the region, and almost the lowest industry figure at £20 10 9d.

Figure 2.3 illustrates the distribution of weekly earnings by men and women in the industry in October 1960 compared with all manufacturing industry. The relative earnings in different industries are believed to have remained fairly constant in recent years, although of course the actual sums of money earned have increased significantly.



(a) Men (b) Women

FIGURE 2.3 – DISTRIBUTION OF WEEKLY EARNINGS IN 1960

Average numbers of hours worked by manual workers in October 1968 are compared below:

| | *Wool textile industry* | *All manufacturing industry* |
|---|---|---|
| Men | 48·5 | 45·8 |
| Women (full time) | 38·3 | 38·2 |

It may be concluded, therefore, that in respect of average hourly earnings and average hours worked per week, the industry does not compare well with other manufacturing industry. When these two factors of lower hourly earnings and more hours per week are combined to give average weekly earnings, men in the industry will earn appreciably less than men in other industries in the same region. Women, on the other hand, have opportunities in the wool textile industry comparable with those obtainable elsewhere.

By an agreement between the Wool (and Allied) Textile Employers' Council and the National Association of Unions in the Textile Trade, normal hours of work in the industry were fixed at 41½ hours a week in a 5 or 5½ day week. This agreement became effective from 1st July 1967, and normal hours will be reduced to 40 a week in May 1969.

In October 1964 it was estimated that about 13 per cent of the wool textile industry was working shift systems, compared with 20 per cent in all manufacturing industry and about 31 per cent in the spinning and weaving of cotton and man-made fibres. Of those working shifts, the distribution between different types of shift system was as follows:

| | *Percentage of all shift workers in the industry* | *Percentage of all industry's total manpower* |
|---|---|---|
| Three shift | 10·6 | 1·4 |
| Two shift–double day shift | 11·5 | 1·5 |
| Two shift–day and night, alternate | 5·1 | ·7 |
| Normal night shift (permanent) | 43·3 | 5·6 |
| Evening shift (part time) | 29·5 | 3·8 |

Since 1964 there has been some increase in the extent of shift working, and officials of the Trades Unions concerned are clearly aware of the probable need for further increases. Discussions have already taken place between the Unions and the Employers' Council with a view to negotiating suitable terms. The present agreed minimum premium for double day-shift working is about 10 per cent of the normal rate for day working, and the agreed night shift premium is 7d an hour, which is about 8 per cent above the normal rate. These minima are sometimes exceeded in individual firms, and it is reported that in some areas the shift premium actually required had risen to 25 per cent.

Regarding physical working conditions in the industry, it has been observed that there are widely varying standards, not only between sectors but also within sectors. Although it is difficult to assess the significance of this factor alone in the industry's recruitment and retention of manpower, it is certainly a relevant consideration. A study of the figures published by HM Factory Inspectorate shows that the industry's recent safety record, as judged by the number of notifiable accidents per 1,000 employees, is better than in manufacturing industry generally. Comparison with all manufacturing industry could lead to unjustified feelings of complacency, but it is doubtful if the industry's accident record has a significant effect on recruitment. It is often said that old mill buildings and the noise or heat associated with some processes have tended to create an image of an unprogressive industry and that this has acted as a deterrent to ambitious young recruits. To study this, an attitude survey was carried out in 1966 by the Wool Industry Training Board. The report on the study confirmed that young people leaving school and those who advise them are indeed often prejudiced against the industry for these reasons among others, although analysis of attitudes regionally indicates that this problem is less serious in Scotland than in

England. Some of these prejudices are clearly unjustified and could be combatted by good public relations. For example, a considerable proportion of those questioned in the survey, especially in the West Riding, considered the wool textile industry to be unhealthy. In fact, the hazards to health are slight and anthrax, for example, is now very rare.

### 2.4 Productivity

Productivity can be defined as output per man per hour, being in turn determined by two factors: firstly, the plant and machinery used, and secondly, the utilisation and industriousness of the operatives.

If output per employee per year is calculated for each of the main production sectors, the following overall increases are found:

| | *Per cent improvement 1958 to 1967* | *Per cent average improvement per year* |
|---|---|---|
| Combing | 44 | 4·2 |
| Worsted spinning | 28 | 2·8 |
| Woollen spinning | 10 | 1·1 |
| Worsted weaving | 12 | 1·3 |
| Woollen weaving | 17 | 1·8 |

For comparison, average male earnings have risen 61 per cent and female earnings 52 per cent in the same period, or 5·5 per cent and 4·8 per cent per year respectively on average. It is alleged that in jobs which can be performed equally easily by either sex, the productivity of women is significantly lower than that of men, a figure of 70 per cent having been quoted. (The reasons include the higher absentee rate among women, higher turnover rate resulting in relatively more time spent on induction and training, and probably better stamina among men.) This is approximately equal to the difference in the hourly earnings of men and women.

The changes in production costs due to increased wage rates, decreased working hours of production employees, and increased production per person, have been calculated. Between 1960 and 1967 the average annual increase in unit production costs has been approximately as is shown below:

| | |
|---|---|
| Combing | 2·8 per cent |
| Worsted spinning | 2·3 per cent |
| Worsted weaving | 4·4 per cent |
| Woollen spinning/weaving | 4·4 per cent |

Even in the worsted spinning and combing sectors, where considerable productivity gains have been achieved by installation of new plant and by the application of method study techniques, there has been an overall increase in the cost per lb of product because of wage increases and these other factors.

It may be anticipated that the trend to shorter working weeks and higher hourly and weekly earnings will continue. The consequent increases in production costs can be combatted by the provision of more efficient plant and by improving operator productivity by method study and training, productivity improvements of up to 30 per cent having already been achieved by the introduction of incentive schemes linked to work study programmes.

Inter-firm manpower productivity comparisons are also being undertaken in a number of sectors of the industry. The first, a pilot project under the sponsorship of the Wool Textile Economic Development Committee, was carried out by the industry's Management Services Centre in eleven firms in the Huddersfield fine worsted weaving sector. This project, which is felt to have demonstrated clearly the efficacy of such schemes, highlighted wide differences between firms in man-hours required to undertake identical or comparable operations, the group's average productivity being about 78 per cent of that of the best. A follow-up study, commissioned by the firms themselves, showed that while differences still remained there was an overall improvement in productivity over the whole group of firms of nearly 10 per cent resulting from the adoption of recommendations made in the pilot study. Similar studies have since been commissioned by various groups of firms producing worsted yarns, acrylic yarns, woollen yarns, carpet yarns and medium-quality worsted cloths.

## 2.5 Training

Full statistical information concerning apprenticeships is not available for any year later than 1965, but it is thought that there has been little change in the overall situation since then. In that year there were 2,644 apprentices in the industry, of whom 52 per cent were in the craft category, 21 per cent and 11 per cent in the technicians and technologists categories respectively, 6 per cent in the commercial category, and 10 per cent in other categories. There were 2,250 apprenticeships successfully claimed in 1966, and 1,768 in 1967.

Only about 2 to 3 per cent of all apprentices are girls. Of all the men aged between 15 and 20, only about a quarter are apprentices, the remainder being trained on the job by observing more experienced workers. About 15 to 20 per cent of craft employees, and all employees in the technician and technologist categories, go through apprenticeships. The average period of apprenticeship is 4 to 5 years, and survey figures indicate that at least a third of all craft apprentices fail to complete their apprenticeships and leave the industry entirely during this period. More effective training methods should enable this wastage, and the length of apprenticeships, to be considerably reduced.

Facilities for further education of apprentices vary greatly from company to company, but a questionnaire in 1965 showed that only 50 per cent of establishments allow any day release, only 4 per cent allow block release, and another 4 per cent allow sandwich release. Scottish companies appear to provide substantially better day release facilities than companies in England. It is significant that the attitude survey mentioned in Article 2.3 above showed the relatively poor prospects for training to be one of the factors deterring ambitious young people from seeking employment in the industry.

Concerning supervisory training, it has been found that only about 13 per cent of all supervisors have attended supervisory courses of any kind, and these courses vary from one-day or part-time studies to full-time courses of a few weeks.

Management training in the industry has been even more scanty. Only about 3 per cent of all managers and salesmen have been through a formal training scheme, and only 5 per cent of all establishments have such a scheme as a regular part of entry into the management structure. Indeed, the proportion of all managers and salesmen who have attended any kind of management training course is about 6 per cent, and many of these courses have been as short as one day. It seems that the industry lacks any real appreciation of the value of formal management training.

The Wool, Jute and Flax Industry Training Board (WITB) aims to ensure an adequate supply of trained labour, to ensure efficiency in training and to share the cost of training equitably throughout the industry. Its finances are provided from a statutory levy authorised by the Department of Employment and Productivity but collected directly by the Board. Although about two-thirds of the Board's members are drawn from the industry, it is formally responsible only to the DEP. The Board distributes the balance of the levy, after meeting its administration costs, in the form of grants to employers to offset partially the costs of individuals pursuing approved training courses. About 85 per cent of the grants paid go towards training of employees below supervisor level. Training in managerial and supervisory grades accounts for about 8 per cent, and the training of training instructors accounts for a further 2 per cent.

Table 2.2 shows the claims made to the Training Board in the year October 1965 to September 1966. This summary of claims is thought to reflect very closely the actual expenditure on training within the industry. The very great regional differences in expenditure on all categories of training are conspicuous, as is the very low expenditure on training of management and supervisory staff.

Table 2.2 – Claims to the Training Board in 1965-66

| | *North England* | | *S. England and Wales* | | *Scotland* | |
|---|---|---|---|---|---|---|
| *Type of training* | *Claimed (£'000)* | *£ per employee* | *Claimed (£'000)* | *£ per employee* | *Claimed (£'000)* | *£ per employee* |
| Managers and supervisors | 48 | 0·3 | 25 | 0·5 | 31 | 1·6 |
| Training officers | 43 | 0·3 | 33 | 0·3 | 24 | 1·2 |
| Operatives | 932 | 9·1 | 715 | 81·0 | 452 | 32·6 |
| Special courses and miscellaneous | 11 | 0·1 | 7 | 0·6 | 9 | 0·4 |
| TOTAL | 1,034 | 7·1 | 780 | 65·0 | 516 | 26·0 |

It is apparent that many small establishments feel themselves unable to make their employees available for training, as is demonstrated by Table 2.3 which shows figures taken from the WITB report for the year October 1966 to September 1967. Small establishments are, in effect, subsidising training for larger establishments, but the figures shown are a great improvement in this respect compared with figures for earlier years.

Table 2.3 – Training in relation to establishment size

| *Size range of establishment (employees)* | *Average levy per establishment* | *Percentage of establishments receiving grants* | *Average grant as percentage of levy* |
|---|---|---|---|
| 1 – 6 | £33 | 12 | 33 |
| 7 – 10 | 73 | 37 | 55 |
| 11 – 25 | 154 | 56 | 80 |
| 26 – 50 | 379 | 82 | 85 |
| 51 – 100 | 774 | 91 | 85 |
| 101 – 200 | 1,611 | 97 | 86 |
| 201 – 500 | 3,364 | 94 | 90 |
| 501 – 750 | 6,793 | 100 | 90 |
| 751 – 1,000 | 9,180 | 100 | 116 |
| 1,001 and over | 22,318 | 100 | 94 |
| TOTAL | £1,089 | 67 | 89 |

Opportunities for promotion from shop-floor level are felt to be limited in comparison with other industries. This features prominently in the attitude survey of boys leaving school as a reason for not joining the industry. The number of overlookers who have not served a craft apprenticeship is reported to be negligible, and the induction of technicians trained in other industries is rare. The very long apprenticeships, coupled with poor facilities for further education, provide considerable barriers to promotion and career development. The prevalence of owner-management also limits the opportunities for promotion into managerial positions, especially in small companies.

### 2.6 Management and organisation

From the questionnaire returns, it was possible to analyse for each major sector the proportion of non-production to production personnel and the approximate proportions of staff engaged in administration, marketing, maintenance, and research and design. The proportions vary within sectors according to establishment size, all sectors other than the two spinning sectors exhibiting positive economies of scale in numbers of non-production employees. Over the whole industry non-production personnel account for roughly one-fifth of total personnel, the combing and dyeing and finishing sectors tending to be slightly above average, with particularly high numbers of maintenance personnel; dyeing and finishing companies also have above-average proportions of staff classed as administration. There is little variation among sectors from the industrial averages of 1 to 3 per cent of all staff being employed on marketing and 1 to 2 per cent on design and research. The functional analysis of the industry's manpower given in Table 2.1 shows that of the 15,000 personnel in the industry in management or supervisory positions, the great majority are men.

A recent survey indicated that only about 7 per cent of the industry's directors were university graduates, while about 32 per cent had technical qualifications. When all types of qualification are considered together, the percentage of directors, proprietors, partners and managers with qualifications was about 63. Of all qualifications, less than 7 per cent were university degrees, 10 per cent were diplomas of various kinds, and about 66 per cent were technical. These statistics support reports that technical qualifications are widely regarded in the industry as being the most valuable for managers, and that few graduates are attracted to the industry unless they have family interests. There is little induction of men who have acquired qualifications and experience in other industries.

Over 90 per cent of the companies in the industry are private companies and a large proportion of these are managed by the owning families. The strong traditions of family continuity and textile education, linked with the small size of the average establishment, have led to very good personal relationships between management and employees. The industry has an outstandingly good record of industrial harmony. Much credit for this is undoubtedly due to the responsible attitudes of the Trades Unions and the employees, but it also reflects a high level of man-management.

In some other respects, also, the industry's management has been successful. In the fields of design and quality the British industry has maintained a position with few, if any, rivals. The central services of the industry give a generally excellent example to other industries. However, it is equally clear that the majority of companies are managed with the aid of few modern techniques. While establishments remain small, they can often succeed without formal control techniques; larger companies, however, must take advantage of their size to engage specialists and use their skills if they are not to experience the failure of communications and logistics which can result in diseconomies of scale. While statistics cannot be produced as evidence, there are good reasons to believe that this is an area in which many companies are deficient. Later chapters will indicate similar shortcomings in the areas of marketing, pricing and planning, all of which tend to give the lie to the industry's reputation for commercial acumen.

The large number of small companies, each of which is normally run by one chief executive supported by a small management team, has resulted in a tradition of principal-to-principal trading within the industry. Even in those companies where the merits of delegation of responsibility are well appreciated, this tradition encourages centralisation of management in the hands of one man. Organisation structures in such companies are often informal.

Companies with more than one establishment or groups of companies are usually organised more formally. Often, however, this consists merely of a formal structure down to establishment level with traditional centralised management of each establishment. While some degree of central financial control is generally exercised, it is rare to find groups which are organised and managed in a fully-integrated manner. More often the establishments are fully autonomous for all purposes except financial planning, and they may even compete to their mutual disadvantage with others in the same group. Central planning and co-ordination of marketing, production and personnel in multi-establishment organisations is not commonly practised.

## 2.7 Use of management control systems

While companies remain small, the planning and co-ordination of all their functions are within the capacity of their chief executives, using informal methods. Even very small concerns, however, are unlikely to survive for long in a competitive situation without effective control systems. As they grow larger and their management organisations become more complex, planning, co-ordination and control systems become increasingly necessary.

The general lack of management training in the wool textile industry has resulted in the majority of companies being run on an ad-hoc basis, with little systematic forward planning. Increasing costs, technological change and competition for labour are putting severe pressures on small companies with this kind of management. At the same time many of those which have expanded are attempting to continue the management methods of the small companies. At the top of the scale it is found that some of the largest groups of companies are equally lacking in centralised planning and control. If this industry is to meet the challenges from abroad and achieve proper profitability, great efforts must be made to modernise its management. The principal control systems are considered below:

### *Production control*

In most companies in the industry, production control is exercised by the mill management as regards priorities, the process departments being responsible for the detailed loading and progressing. Few companies have a central production controller who is fully responsible for the planning, loading and progressing of work through the production departments. Where a production controller exists, his authority is usually limited to issuing job orders and following their progress, priorities being prescribed for him by higher management. Central production control in groups of establishments is generally lacking, although substantial benefits are potentially available either in vertically integrated organisations or in horizontally integrated organisations making similar products.

Most companies which have costing systems keep daily or weekly records of production in each process. The records relating to the principal products are generally satisfactory. However, there is widespread dissatisfaction in the industry with the systems for locating, recording and controlling of waste.

Modern techniques for production scheduling, such as linear programming, require accurate understanding of the unit cost of each product on each available machine, the realisable price, the likely saleable quantity, and the resources needed and available for each product. Given reasonably accurate information of this sort it is possible to calculate product mixes for maximum profit. For many companies, however, production labour is scarce and is paid by results. Any temporary shortage of work causes loss of labour, and the first priority is often, therefore, to keep machines operating even if the resulting schedules are less than optimal.

### *Stock control*

Stocks are held by the industry for a variety of reasons, as discussed in Article 1.11, where it was also shown that the total book value of stocks and work in progress in the industry currently accounts for 45 per cent of the industry's total assets. In some processing companies this proportion rises as far as 60 per cent, while companies operating partly as merchants can be even higher. That the cost of stockholding is high is fairly generally appreciated, and efforts are made to control costs; for example, it can be seen from statistical records that significant permanent reductions in merino stocks occurred after periods of very high Bank Rate. Most companies carry out frequent stock-checks and assess their order books against stock reports. However, it seems probable that, just as the expected return on capital investments in the industry is low, so the true cost of holding stocks is not fully appreciated. It should be borne in mind that the cost of stockholding comprises not only the physical cost of warehousing but also the cost of the capital involved and it will be shown in Articles 5.1 and 5.2 that bank borrowing in the industry finances only about 37 per cent of the assets held as stock or work in progress. The true cost of capital to be used in determining the cost of stock should, therefore, be the return that could reasonably be expected on the capital involved, and while this cost will vary depending on the actual methods of financing it is quite likely to be well above the cost of bank finance. On this basis, then, the cost of holding stocks of tops can be up to ¼d per lb per week, that of yarns up to ½d per lb per week, and that of finished cloth up to 1½d per yard per week. Similarly, the average cost of holding a piece of finished cloth on call is estimated to be nearly £3 per piece. It is, therefore, vital that companies cost their stocks correctly and justify fully their reasons for holding the stocks or for not reducing the time taken to process materials.

Further improvements in stock control are available through the use of more sophisticated techniques and particularly by co-ordinating stock control with detailed production planning. Operations research techniques are available, and the Wool Industries Research Association is carrying out a comprehensive study to determine where these techniques can be applied effectively in the industry.

Apart from possible improvements in the industry's stock position arising from individual companies' use of control techniques, further gains are potentially available. Generally it can be shown that, where there are many producers supplying many customers, the industry as a whole could hold less stock if each establishment concentrated on a few products and each product were made by only a few establishments. Also, in the present situation, somewhat less stock could be held if establishments were fewer and larger and if vertical integration were more common. However, in either case, effective stock control techniques would be needed to realise the available savings.

The industry is now organised to process a large number of qualities of raw materials into an almost infinite range of product qualities. Some standardisation of qualities of raw materials and intermediate products would greatly facilitate production planning and stock control and significant savings in stocks would be achieved. As colour is an important variable, the position of dyeing in the process route can have an important bearing on the stockholding cost of each product. These considerations are dealt with more exhaustively in later chapters.

### *Costing and financial control*

Questionnaire returns indicate that only about 50 per cent of companies are preparing monthly profit and loss statements, and relatively little use is made of financial ratios or control charts. About 70 per cent of all companies which are carrying out a production process are using some form of costing. In the early processes such as carding, willeying and combing this is often a form of historical costing, while in the later processes, particularly in spinning, weaving and dyeing, standard costing is common. Probably all of these companies use their cost information as a basis for pricing, although prices are rarely determined on this basis alone, except perhaps in the case of contract cloths and other highly standardised products. Many of the systems in use are incomplete; some only include direct costs in the standard process costs, whereas the majority include departmental overheads but exclude general administrative overheads. Pricing would certainly be more accurately related to costs if the systems were more comprehensive, but this may be impractical in many small companies. The control function in costing varies greatly with company size because the managements of small companies tend to be closely in touch with detailed production and commercial operations.

There is a fairly good appreciation of the accounting equipment available and reasonable utilisation of such machinery, especially in companies employing more than about 200 people. At least 8 computers are known to be in use in the industry and several other companies are actively planning to use computers in the next few years. It has been estimated that there is now potential for about 200 to 300 bureau users in addition to within-company installations. Any further concentration of the industry into larger units is likely to increase the potential for computer use, although the most promising developments appear to be in bureaux rather than in new installations in companies.

Cash forecasting and capital budgeting are practised regularly by a few larger companies, but generally only at times of capital expenditure by most small and medium sized companies. The majority of capital expenditure is for replacement rather than expansion and there are therefore normally few projects competing for funds. For this reason little use is made of sophisticated methods of appraisal. Many companies find forecasting or budgeting difficult owing to the wide variances obtained from sales budgets and the problem of predicting prices. However, it is found that other companies in the same sectors selling similar goods are achieving some success, and deriving benefit from the use of these procedures.

# Chapter 3 Marketing at present

## 3.1 The industry's products

One of the most notable features of the wool textile industry is the extremely diverse range of its products. Although there is considerable variation in the specification of tops and other intermediate products, it is in the fabrics produced by the industry, and to a rather lesser extent the yarns, that this diversity is most significant. In order to indicate this variety, means of classifying fabrics and yarns will be considered in three groups.

The first group is concerned with the markets and customers for the products, and the use for which they are intended. Yarns are sold to the knitting industry, the carpet industry and for hand-knitting. The vast majority of fabrics is sold to the clothing industry, but this must be subdivided into the large number of different garment types for which wool textiles are used, ranging from men's overcoatings to women's dress cloths. There are also often marked differences between products made for export and those destined for the home market.

The second group of methods of classification is concerned with the product itself as it appears to the user. The design, colouring, weight, and finish of a fabric, together with more subjective features, such as drape and handle, are the characteristics which will determine consumer preference for the finished garment. It is, therefore, these characteristics which determine the total potential market for the product, and hence the scale on which it can be produced and marketed.

The third group is concerned with the processes and techniques used by the industry itself to produce the product. These range from the choice of raw material or blend and the spinning system used, to the particular weave chosen to produce the desired effect. An important distinction in this field is the dyeing system used. It is differences of this sort which determine the costs of producing the product.

## 3.2 The markets

The main markets of certain sectors of the industry, such as the combers, are other sectors of the industry itself or of other wool textile industries overseas. In discussing the markets of the industry, therefore, it is important initially to distinguish between exports, use within the UK but outside the industry, and use within the industry. The first four columns of Table 3.1 show this breakdown for each of the industry's products. It may be seen that the industry exports a substantial proportion (20-25 per cent) of tops and woven products, but a relatively small proportion of yarn production. Combed tops are sold in a wide range of overseas markets, of which Canada and Scandinavia are the most important. Domestic production is negligible in both these areas. Converted tops are also sold in a large number of fairly small markets, EFTA and the Soviet bloc being the largest.

Exports of both worsted and woollen cloth tend to be rather more concentrated in the large markets constituted by the developed countries. The United States, Canada and Western Europe are important markets for both types of cloth. Hong Kong and Japan also receive a substantial proportion of UK exports.

It may be seen from Table 3.1 that of the worsted yarn spun by the industry for use in the UK, only about 45 per cent is used within the industry for weaving. The balance is sold outside, mostly for machine knitting or as hand-knitting yarn. Some worsted yarn, almost entirely of man-made fibre, is spun outside the industry, and small quantities are imported, with the result that the industry supplies about 90 per cent of total domestic consumption. In woollen yarn, only 27 per cent of the industry's production for home

Table 3.1 – Markets at home and overseas

| *Product* | *Production of the industry (m lb per year)* | | | | *Other UK industries, production for home use (m lb per year)* | *Imports (m lb per year)* | *Net home consumption (m lb per year)* |
|---|---|---|---|---|---|---|---|
| | *TOTAL* | *Exports* | *Used outside industry* | *Used by the industry* | | | |
| Combed tops | 202 | 51 | – | 151 | – | 2 | 153 |
| Converted tops | 55 | 11 | – | 44 | 16 | 8 | 68 |
| Worsted yarn | 201 | 14 | 104 | 83 | 16 | 3 | 206 |
| Woollen yarn | 217 | 13 | 56 | 148 | 79 | 1 | 284 |
| Semi-worsted yarn | 15 | – | 15 | – | 24 | – | 39 |
| Worsted woven cloth | 80 | 19 | 61 | – | – | 1 | 62 |
| Woollen woven cloth | 128 | 29 | 99 | – | – | 14 | 113 |
| Woven blankets | 10 | 2 | 8 | – | – | 10 | 18 |

use is sold outside, nearly all to the carpet manufacturers. In addition, these manufacturers spin very large quantities of their own yarn requirements, with the result that the industry supplies only 70 per cent of total domestic consumption.

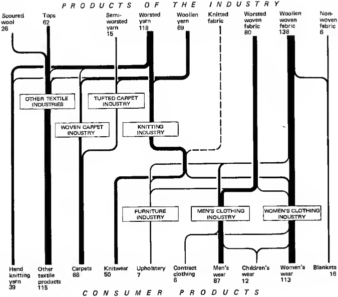
The industry is subject to competition in its home markets in a number of other products. Converted tops produced outside the industry reduce the industry's share of the home market to about 65 per cent. External production of semi-worsted yarn, again by the carpet manufacturers, leaves the industry with only about 40 per cent of this market. The two products for which imports are most important are woollen cloth, of which imports, mostly from Italy, supply about 12 per cent of home consumption, and blankets, of which over half of UK consumption is imported.

### 3.3 Customers of the industry

Figure 3.1 illustrates the flow of products from the industry to its customers. It is immediately apparent that the bulk of the industry's production is sold to subsequent industries for further processing. Blankets and hand-knitting yarn are the only finished products, all others being intermediate. Although the wool textile products used by these subsequent industries may be similar, the nature of the industries themselves when considered as customers is quite different, and it is from this viewpoint that they are discussed here. Yarn-consuming industries will be dealt with first, with reference to Table 3.2, followed by fabric-consuming industries, with reference to Table 3.3.

#### *The knitting industry*

The two basic knitting processes, weft and warp knitting, in fact form two separate industries. Warp knitting, however, is predominantly a user of filament yarn, and hence is of only minor interest as a customer of the wool textile industry. The weft knitting industry can in turn be subdivided into the two main types of product which it manufactures. The bigger sector is knitwear, that is, the production of garments as such. The smaller sector produces knitted fabric for further processing by the clothing industry, and it is here that growth has been most notable in recent years, output having increased five-fold since 1958.



*Numbers represent millions of lb per year*

FIGURE 3.1 – THE INDUSTRY'S CUSTOMERS

Table 3.2 shows that worsted yarns and modified filament yarns form the bulk of the weft knitting industry's raw materials, with small quantities of woollen yarns being used for specialist products. As mentioned in the previous article, some spinning of worsted yarn is done outside the wool textile industry; these yarns are used almost entirely for weft knitting.

Table 3.2 – Home markets for yarns

| | *Consumption (m lb per year)* | | | | |
|---|---|---|---|---|---|
| *Yarn type* | *Weft knitting* | *Hand knitting* | *Woven carpets* | *Tufted carpets* | *TOTALS* |
| Worsted | 78 | 37 | 7 | – | 122 |
| Woollen | 8 | 2 | 112 | 13 | 135 |
| Semi-worsted | – | – | – | 39 | 39 |
| Modified filament | 47 | 2 | – | 7 | 56 |
| Cotton | – | – | – | 25 | 25 |
| TOTALS | 133 | 41 | 119 | 84 | 377 |

It is estimated that about 100 firms are engaged solely or partly in spinning yarns for the knitting industry. Variation in their size is very great. Against this, there are about 900 firms in the knitting industry itself, about 80 per cent employing fewer than 100 people.

*The carpet industry*

Again, it is necessary to divide this industry into two main divisions, one making woven and the other tufted carpets. The outputs of the two sectors are roughly equal at the moment, but production of tufted carpets has grown rapidly in the past, while that of woven is currently about 4 per cent above the 1964 level, having fallen off sharply in the intervening years. The two sectors have quite different patterns of yarn consumption. Woven carpets use woollen yarn almost exclusively, while tufted carpets use mainly semi-worsted and cotton spun man-made fibre yarns, with smaller quantities of woollen yarns and a small but growing proportion of modified-filament nylon yarns.

Both sectors of the carpet industry spin large quantities of their own yarn requirements themselves, and the tufted sector obtains significant quantities from traditional cotton spinners. There are in total about 150 firms making carpets in the United Kingdom; many of these are small, however, and it is estimated that the ten largest weavers produce about 70 per cent of all woven carpets and that eight tufting firms produce about 60 per cent of all tufted carpets.

*Hand-knitting*

Table 3.2 shows that the hand-knitting yarns are nearly all worsted-spun. There are at least 50 spinners manufacturing hand-knitting yarn, but fewer than 20 have a significant market share. All are included within the wool textile industry.

*The clothing industry*

The distinction drawn between the men's and women's clothing industries in Figure 3.1 has been made to illustrate the difference in fabric requirements of the two sectors. In practice, however, there are several companies manufacturing garments for both men and women, so that this distinction is rather arbitrary. It is also difficult to define precisely the borderline between, for example, women's wear and children's wear. One important difference between the manufacture of clothing for men and women is that within the menswear sector there are distinct types of manufacturer such as the multiple tailor, the bespoke tailor and the wholesale clothier, whereas in the women's sector there are no comparable distinctions to be drawn, although there is considerable variation in size of company. The importance of the company size in this context is that it will affect the bargaining power of the buyer, and also whether he tends to buy direct or through a merchant.

Although the clothing industries produce a very wide variety of garments, it is outerwear which is the main interest of the wool textile industry. In general, it can be seen from Figure 3.1 and Table 3.3 that the most important markets derived from the clothing industry are for worsted fabric for menswear and woollen fabric for women's wear. In addition, substantial quantities of woollen fabric are used for menswear and of knitted fabric for women's wear.

**Table 3.3 – Home markets for fabrics**

| | *Consumption (m lb per year)* | | | | |
|---|---|---|---|---|---|
| *Fabric type* | *Menswear* | *Women's wear* | *Upholstery* | *Blankets* | *TOTALS* |
| Woven worsted | 52 | 7 | 3 | – | 62 |
| Woven woollen | 29 | 82 | 2 | 18 | 131 |
| Knitted | 5 | 40 | 11 | – | 56 |
| TOTALS | 86 | 129 | 16 | 18 | 249 |

*Blankets*

The traditional woven woollen blanket is made entirely within the wool textile industry, and has been classed as a woollen woven fabric for the purposes of this study. In recent years, however, the production of blankets by needle punching has grown rapidly, and this trend is expected to continue. These blankets are made from carded web, but generally by the same companies that produce woven blankets, so that total production of blankets is likely to remain within the wool textile industry.

*The furniture industry*

Small quantities of wool textile fabrics are used for upholstery. There are of course a very wide variety of other fabrics used for this purpose, among which knitted fabric is probably the most important and certainly the one which is growing most rapidly. Large quantities of this are double-jersey fabric in 100 per cent modified filament nylon.

### 3.4 Marketing in the United Kingdom

In dealing with the industry's customers in the previous article, the emphasis has been on the industries which actually use the products of the industry, and process them to the finished product stage. It is from these industries that the demand for wool textile products is derived. It is necessary now to consider in more detail both the different types of buyer within these industries, and the various distributive trades which appear in the marketing channels.

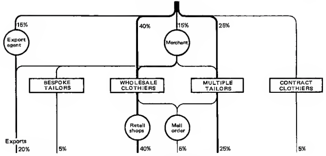
Figure 3.2 shows the channels used for fabrics, and indicates their relative importance to the industry. Trades which actually process material are denoted by rectangles, while trades providing a purely distributive function are denoted by circles. In general, the plainer fabrics, or those which are required in large quantities, are sold direct to the user, while those with a high fashion element and ordered in smaller lots are handled by the merchants. Many fashion goods, of course, are used by companies large enough to buy direct from the mills on their own account. Each link in the distribution chain will now be discussed in turn.

*Cloth merchants*

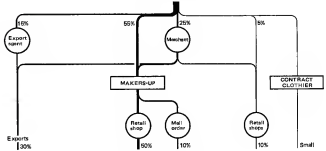
The services provided by cloth merchants differ significantly between the men's trade and the women's trade. In the men's trade, most merchants' sales are of cut lengths ready for the manufacture of suits by the tailor, so that perhaps the most important function of the menswear cloth merchant is the breaking up of bulk purchases into small lots. Most merchants in this field offer a stock service against the pattern bunches with which they provide their customers, and are also able to offer a variety of cloths selected from the ranges of a number of manufacturers, so that their ranges are normally much wider than those offered directly by the mills. In addition to the length trade, several merchants have a small business in pieces which carry a smaller mark-up. This trade is, however, declining.

In the women's trade there are two main types of cloth merchant. The first includes a group of about a dozen merchants in London and a few conducting similar business in Manchester. The characteristic of this trade is that the cloths handled are relatively cheap, and although certainly fashion goods they are by no means high fashion. These merchants specialise in supplying the many small makers-up of women's and children's wear in the London area. Many of these makers-up are rather unstable companies and represent high credit risks. Many are also very small, and are unable to finance their own operations. The merchants are prepared to offer long credit to such companies, and it is for this service that their mark-up is charged. Few manufacturers in the wool textile industry would be prepared to conduct business on such terms, so that in this context the merchants provide a valuable service.

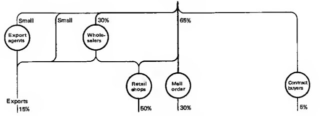
The second type of merchant in women's wear is more concerned with high fashion goods. In this trade the average order size is very much smaller, so that again it is a function of the merchant to divide bulk orders into small lots. Because of the high fashion content of their



(a) Fabric for Menswear



(b) Fabric for Womenswear



(c) Blankets

FIGURE 3.2 – MARKETING CHANNELS

goods, these merchants carry a high risk of unsold stock, and hence in general will charge a higher mark-up. As well as supplying makers-up, these merchants also provide piece goods for sale as fabric by retail outlets. These merchants themselves tend to be smaller than those in the low fashion trade, but will nevertheless initiate designs themselves and thus provide a valuable link between customer or maker-up and manufacturer.

A merchant's mark-up depends heavily on the size of his order. Mark-ups of the order of 50 per cent are obtained for small lengths, but for greater lengths, and in particular for full pieces, mark-ups of about 15 per cent are more usual.

The services which the merchants provide indicate in which fields they are of most value to the wool textile industry. These are where the customers themselves are small, where the customer wishes to order in small quantities, or where a stock service is required.

*Bespoke tailors*

Although bespoke tailoring has been declining for some time in the UK, there remain a very large number of small bespoke tailors throughout the country. The nature of their business is such that they rarely require more than a few suit lengths of any particular design, and they therefore typify the sort of market which is best satisfied through the merchants. Few manufacturers in the wool textile industry would care to handle this business direct.

*Multiple tailors*

The multiples now provide about 60 per cent of suits in the UK in addition to smaller quantities of trousers, jackets, and so on. Most multiples are large enough to deal direct with the mills, and use merchants only for rather specialised requirements. The very large multiples are, of course, much bigger than most weavers in the wool textile industry, and are thus in a strong bargaining position when placing orders. Few mills, however, are totally committed to these large buyers, as it appears that it is their policy to divide their requirements among a large number of suppliers. Questionnaire returns indicate that few manufacturers sell more than 25 per cent of output to the multiples.

*Wholesale clothiers*

Apart from suits, most men's outerwear is made not by tailors but by the wholesale clothiers. There is a very large number of companies of various sizes in this field, using woollen as well as worsted fabric. The garments which they produce are sold to a wide variety of retail outlets, and some of them sell branded products which are heavily promoted. Some 15 of the larger clothiers specialise in uniforms and contract clothing for Government departments and other organisations in the public sector, as well as schools and the like. There is of course a minimum of promotion in this field, most contracts being placed by tender. The largest contract clothier has about two-thirds of the business and six others account for much of the remainder.

*Makers-up*

Apart from a number of women's clothiers who make garments by factory methods, the great majority of women's clothes are made by small makers-up. In some cases, large retailers will buy quantities of cloth and have it made up to their specifications on commission. In other cases, clothiers develop their own styles and make-up sample garments for showing to retail shops.

*Mail order*

Rapid growth has occurred in the last few years of sales of garments by the mail order houses. This applies particularly to women's and children's wear. These organisations have extremely high turnovers, but this of course includes a wide range of products not associated with textiles. Most of their products come from either wholesale clothiers or makers-up, and they will frequently use a clothier's brand name. Mail order is particularly important as a means of retailing blankets.

*Marketing of yarns*
The marketing of hand knitting yarns has special features, because the industry supplies the final consumer product. A large number of outlets is used, many of which sell only small quantities. The number of retail establishments whose sales of hand knitting yarns form a significant proportion of their turnover is around 8,000, while the total number may be as high as 30,000. However, the number of outlets is declining, and in particular so is the number of specialist wool shops. This is important, as these specialists currently account for some 47 per cent of total sales. Most spinners supply retailers direct, and do not deal with wholesalers; in fact, some specialist retail shops are controlled by the spinners themselves. Few retailers hold large stocks themselves, but give small, frequent orders and demand rapid delivery.

Nearly all hosiery yarn is sold direct to the knitters, and there is a growing trend towards links between spinners and hosiery firms. Although the wool textile industry's general practice of manufacturing to order is widely used in the hosiery yarn trade, at least one spinner now operates a full-scale stock service.

Tufted carpets tend to be sold more on price than woven carpets, and since tufted carpet manufacturers use largely man-made fibres of known basic price, spinning for this trade is highly price-competitive. On woven carpets, particular attention is paid to buying and blending wool from many sources in order to achieve the cheapest blend compatible with quality.

### 3.5 Marketing overseas

Figure 3.2 indicates that very little selling direct as such to customers in export markets is done by the wool textile industry. Most exporting is in fact done either by the mills themselves dealing through an agent in the importing country, or by British merchants, although generally the interposition of the agent is not regarded by the industry as weakening the direct selling link.

*Export agents*
The function of the export agent paid a commission on business transactions is to submit offers of business to his principal and thereafter generally to ease communications between supplier and customer. A good agent will also provide his principal with valuable advice on fashion trends in his market, and may even initiate designs himself. For these services, agents are normally paid a fixed commission which varies from country to country, but averages about 1 per cent for tops, 2½ per cent for yarn and 5 per cent for cloth.

The success with which the agency system is used varies greatly within the industry. Successful exporting firms are well aware of the importance of a good agent, maintain regular personal contact with their agents in their important markets, and use their knowledge of market requirements. They have a good idea of an agent's coverage, and are able to judge an agent's performance. Less successful companies, however, adopt a much more passive role, merely appointing an agent and then taking little further interest. It is vital that an agent be regarded as a marketing accessory who cannot wholly replace the necessary contact directly between supplier and customer, which many companies allow to lapse.

*Merchants*
As far as tops and yarn are concerned, the main function of merchants is to represent the

smaller firms who do not export direct themselves or through agents. This function is less important in the case of cloth. The London woollen merchants, who account for the bulk of indirect cloth exports, buy in bulk and sell mainly in cut lengths and half-pieces to overseas wholesalers, tailors, stores and small clothing manufacturers. These merchants are also an important influence on design, and provide a stock service. Thus, as in the home market, merchants should be regarded as a complementary rather than an alternative method of selling. Estimates for the proportion of wool textile exports sold through merchants are given below:

| | |
|---|---|
| Tops, wastes and raw materials | 13 per cent |
| Yarn | 13 per cent |
| Cloth | 21 per cent |

### 3.6 Marketing within the industry

In the earlier articles of this chapter, the products and markets of the industry have been dealt with as if the industry itself possessed some corporate identity. Since, in fact, the industry consists of a large number of quite separate companies, it is necessary now to consider marketing of products by one sector of the industry to another.

*Marketing of tops*

There are two distinct kinds of firm which produce tops. The 'pure' topmaker buys wool, sorts and blends it, and has it combed on commission. The topmaker-comber, on the other hand, carries out the combing operation himself. In the past, a large proportion of the combs in the industry were operated by pure commission combers, but these have now been almost entirely eliminated. The topmaker must, therefore, now rely on the topmaker-comber accepting commission work in addition to combing on his own account.

A major activity of the United Kingdom topmaker is sorting and blending. Sorting is considerably less important now than in previous years, owing to the grading of fleeces at source; however, it still provides an opportunity for competition. The skills required for successful blending need many years of experience, and in this Bradford probably leads the world. The use of wool from Uruguay, the UK clip, and other lower priced qualities, along with more expensive grades may, with skill, provide economic blends while retaining an acceptable quality. In some export markets, however, the quality of British tops is suspect because it is believed that, because blending takes place, there is a danger that nominal qualities might in fact conceal serious shortcomings. Moreover, it is just as important that British spinners should be able to rely on obtaining stated qualities. While, therefore, blending is a traditional skill of the industry, it is questionable whether it should be so necessary today or in the future.

With the decline of markets in the late 1950's, the commission combers found order books shortening. The sector reacted by absorption of topmakers into the combing groups, accompanied by widespread horizontal integration and rationalisation. Seven combing companies now have 56 per cent of total employment, and the ten largest have 65 per cent of the combs installed.

Payment terms are standard, the maximum credit being about three weeks. These terms are not generally accepted overseas, where many customers demand 180 days' credit. Although many spinners buy common qualities of tops, it is the general practice to comb against orders received. This is in contrast to the continental practice, which is to make a batch of tops and offer quick delivery against a sample drawn from the actual batch.

*Marketing of yarns*

Much of the woollen sector of the industry, and particularly firms dealing in fancy goods, are vertically integrated. The principal subject of this article is thus the sale of worsted yarn to weavers.

Average order sizes vary widely, depending on the type of yarn produced. In the fine end of the trade, orders tend to be very small. Spinners of the fine yarns spin only against orders, except for some occasional quantities of black yarns of popular qualities which may sometimes be made to stock.

Other spinners deal in bulk quantities of heavier yarns. Spinners of this type sometimes make for stock, particularly undyed yarns of standard counts, quick delivery often being an important factor in selling.

*Mungo, shoddy, noils, broken tops and wastes*

A large proportion of the mungo and shoddy produced by independent rag-pullers is consumed by the cotton warp sector of the trade to produce cheap fabrics, mainly for the blazering and duffel-coating market. For the standard ranges, prices have remained fairly stable in spite of fluctuating wool prices. Some grades of rags have been scarce, however, partly because the higher qualities tend to be exported. In the longer term, a serious problem may arise because of the increasing intrusion of man-made fibres into fabrics, which make it difficult for the rag-puller to guarantee the constituents of his products.

In contrast to much of the industry which expects to operate on long order books, shoddy manufacturers hold large stocks of rags and expect to deliver nearly all their orders within one or two weeks.

Noils and broken tops are used by spinners of high grade woollen yarns. Noils are generally sold through merchants, who enter into contracts with topmakers. The merchants' functions include collection, sorting and blending. Carding and spinning wastes are merchanted in a similar way. The number of waste merchants is about 100, nearly all being very small private firms.

*Commission working*

Although not strictly an element of trading within the industry, commission working is so prevalent as to warrant brief consideration. Commission combing by topmaker-combers has already been mentioned. Commission dyeing is very important, and there is a little commission spinning.

Because the industry is highly fragmented, it is often possible for commission operators to collect more economical batch sizes and hence to organise production more efficiently than single small companies. However, pricing tariffs for commission work do not appear to be properly related to costs; in particular quantity discounts are extremely small.

The time required for commission dyeing is commonly 2 to 6 weeks, and this has been compared unfavourably with dyeing services obtainable in other Western European countries.

### 3.7 Design and sample-making

A very large proportion of the industry's products have some element of fashion content. This means simply that design is an important feature of the product and that there is always some uncertainty about the degree of success of any particular design. Fashion content also implies that a large proportion of the market exists only for new designs.

This situation results in practically all manufacturers in the industry producing samples. The volume of sampling done varies widely, mainly dependent on the degree of influence fashion has on the market. A manufacturer producing a large volume of patterns will have a design department producing original ideas which are translated into cloth on pattern looms as blankets or section ranges. Where only a small number of patterns are produced, there may be no design department or pattern looms, all new ideas being produced in lengths.

There are two seasons each year, and patterns for each season are presented rather more than a year before the season. A typical sequence of events leading up to a Spring season would be as follows:

| | |
|---|---|
| October 1967 | Fashion forecasts of colours, etc |
| October 1967 to March 1968 | Development of new designs |
| March to April 1968 | Finalisation of ranges and showing to customers |
| May 1968 | Orders placed |
| October to November 1968 | Cloth delivered |
| December 1968 to February 1969 | Garment manufacture |
| Spring 1969 | Garments in retail shops |

In some cases, one sample may be seen by many potential customers. In others, however, it is necessary to leave the sample with a customer. This can be an important cost factor, particularly where pattern blankets are concerned.

Following presentation, the form of response depends on the customer's business. The next stage may be an order for pieces or only for a sample length. Such lengths carry high production costs, up to three or four times as great as normal production, but are usually sold at the normal yardage rate.

One important problem associated with this sequence of events is the practice of 'knocking-off'. In its worst form this is carried out by the so-called 'manufacturers without looms', who typically operate from a small office with very low overhead costs. The practice is to choose some attractive designs from manufacturers' ranges, collect a few orders, buy in the necessary yarns, and have the fabric woven on commission. In this way, the same cloth can be produced with no design cost, little overhead cost, and no risk. While this is considered unfair competition by many manufacturers, it is by no means illegal, nor is it fundamentally different from a manufacturer himself making a cloth to a customer's specification which may well be inspired by a competitor's design.

Total sample making costs are generally an appreciable proportion of total costs. Questionnaire returns indicate that for 20 per cent of all manufacturers direct costs of design and sample making exceed 5 per cent of total manufacturing costs.

### 3.8 Promotion

In discussing current promotion activity in relation to wool textiles, it is necessary at the outset to distinguish between advertising to the trade and advertising to the consuming public.

Expenditure by the wool textile industry itself is largely confined to trade advertising. This has the advantages of directness and relative cheapness, but on the other hand in a closely-knit trade where reputations are mainly well-established, it is relatively impersonal and may be superfluous.

Current total press and television advertising expenditure upon wool textile products is about £12 million per year, made up as follows:

| | |
|---|---:|
| Natural and man-made fibres | £3,000,000 |
| Wool textile industry–suitings | 100,000 |
| –blankets | 120,000 |
| –hand knitting yarn | 500,000 |
| Knitted outerwear | 650,000 |
| Coats, dresses and suits | 450,000 |
| Socks | 80,000 |
| Sports and casual wear | 200,000 |
| Carpets | 2,000,000 |
| Tailors (principally men's multiples) | 1,700,000 |
| Men's outfitters | 350,000 |
| Retail stores | 2,600,000 |
| | £11,750,000 |

It may be seen that the wool textile industry itself accounts for less than £750,000 of this total, or about 6 per cent.

The hand knitting yarn spinners are the main advertisers within the industry. In addition to press and television advertising, other media such as point-of-sale displays are important to this sector. The figure for suitings includes expenditure by merchants and by the Harris Tweed Association, in addition to cloth manufacturers.

The importance of promotion of fibres is clear from the figures. This category includes expenditure by the International Wool Secretariat (£855,000 in 1966), and by the Scottish Woollen Publicity Council (£32,000 in 1966). The high figure for carpets should also be noted; of all wool textile products these are probably sold most aggressively.

In the export field, the bulk of promotion of the industry's products is carried out by the National Wool Textile Export Corporation (NWTEC). The funds available to this body are small (about £150,000 in 1965/66) and currently declining, but it is hoped that the Board of Trade will allow the Delegation's request that the levy basis be changed, thereby restoring the Corporation's income. The Corporation's main aim is to identify British cloth and thus exploit the reputation for quality it enjoys among consumers abroad. Much of their expenditure, especially in the United States, is a joint promotion with clothing manufacturers and retailers, taking the form of distribution of promotional literature to consumers. For a large proportion of this promotional expenditure NWTEC expenditure is matched by contributions from the Board of Trade.

It may be noted that, although a consumer's choice of garment is often influenced by the design and quality of the cloth, the presence of the clothing industry between weaver and consumer results in there being virtually no direct communication between the wool textile industry and the public. Probably because of this gap there is relatively very little advertising by the industry to the public, except in the case of blankets and hand knitting yarn where the industry sells to the consumer directly.

### 3.9 Price determination and conditions of contract

In a free economy, the relationship between the cost of producing an article and the price which the supplier is able to obtain will depend on the level of competition that exists in the supply of that product. This level in turn will depend upon the degree of over- or under-capacity which exists to produce the product and the number of producers prepared to supply it. The processes used in the production of wool textiles are in general well known and comparatively straightforward, and are also flexible in that they are able to produce a wide range of products. The result is a large number of small companies able and willing to produce similar products. The decline of many of the industry's markets in recent years has led to a degree of over-capacity in many sectors, so that over-competition exists in many fields. There is thus at the moment a great deal of weak selling in the industry, which leads not only to low margins in the nominal prices obtained for products but also to the provision by many companies of other services for which the appropriate price is not always obtained. It is because of the general weak selling position that companies are keen to provide these services, often without sufficiently detailed costing systems to give an understanding of the penalties involved. Several examples of this may be given. Most companies give small discounts for quantity which are regarded largely as incentives for large orders rather than as true reflections of the costs of small batch production. It is generally accepted in the industry that batches are unnecessarily small, and that this inhibits efficient production planning and stock control. Few companies, however, are prepared to offer sufficiently attractive quantity discounts to significantly affect their average batch size.

All companies offer discount for early payment of accounts. These very rarely, however, reflect the true cost of credit to the company, and indeed are often incentives to the buyer to delay payment and thus obtain credit more cheaply than it is generally available. The 'on-call' system may be considered in the same context. The system is generally accepted as being against the interests of the industry, largely because it is offered as a service without an appropriate price premium. Customers are, therefore, encouraged to delay their delivery instructions as far as possible, thus avoiding stockholding costs. In some cases, as for example when colouring instructions can only be given as fashion trends develop, the customer has a genuine need for 'on-call'. In such cases the supplier must offer the service, but the cost involved should be understood and recovered.

Recommended scales of premia and discounts of this kind are published by a central body, and these scales are in general use. They are not, however, entirely appropriate and certainly require updating.

A further aspect of price determination is the relative skills of buyer and seller in the bargaining situation. The seller must be aware not only of the costs incurred by his own company as discussed above, but also of the potential value of the product to his customer. The amount by which the negotiated price exceeds cost and approaches value to customer will depend not only on the level of competition but also on these relative skills, and it seems clear that most companies in the industry start selling on the defensive and fail to maintain acceptable price levels.

Most of the comments above apply equally to home and export sales. A problem most relevant in the export field is that of bad debts, particularly as the industry's overseas markets include a fair proportion of developing or politically unstable countries. The Export Credit Guarantee Department's guarantee services are used by most exporting companies, as are their credit facilities, although the high cost of credit in this country relative to that in many of the industry's markets overseas results in a net loss in transactions of this sort, since suppliers must offer competitive terms in export markets.

### 3.10 Procurement of raw materials

Although this chapter is mainly concerned with marketing, it is convenient here to discuss present practices in relation to the procurement of raw materials. As described in Chapter 1, these have been divided into three categories; wool and hair, man-made fibres, and wastes.

#### *Wool and hair*

Marked differences exist in the degree to which the various methods of buying raw wool are used between the various countries of origin. Australian wool is sold almost entirely through an auction system. Wools from a large number of growers are set out in lots and displayed by a selling broker for examination by the buyers; it is then offered at public auction and knocked down to the highest bidder. Buyers will normally have been commissioned by a mill or merchant. Most of the clip is bought by a small number of buyers. The auctions continue throughout eleven months of the year, moving from one centre to another. The volumes offered at each sale are planned on an estimate of the total clip to avoid short-term shortages and surpluses. This provides a measure of price stability, which is reinforced by the setting of reserve prices.

In New Zealand the majority of the clip at present is again sold at auction. All wool offered at auction is subject to a floor price set by the NZ Wool Marketing Commission, who take in any wool not making their price. This reserve price is intended to be fixed for a season and thus to guarantee returns to growers. It was, however, altered in mid-season 1967/68 after extensive buying-in at the previous level in the 1966/67 season, and a deficiency payment was made to growers. A similar system operates in South Africa, where all wool must pass through an auction.

There are no auctions in South America. Nearly all the wool is bought privately by six large organisations. There is some degree of intervention by the respective governments in the setting of wool prices by means of exchange restrictions.

Virtually all British fleece wool is sold through the British Wool Marketing Board. This is again by auctions which are arranged by merchants acting as the Board's agents. The actual sales are conducted by the Committee of London Wool Brokers. A reserve price is set, and any lot failing to reach the reserve is bought by the Board.

*Man-made fibres*
All man-made fibres produced in the United Kingdom are bought directly from the manufacturers. Polyesters are sold in top, staple and filament form mainly by ICI, Dupont, British Enkalon and Hoechst. Rayon is sold mainly by Courtaulds, with some imported fibre, in top, staple, tow and filament form.

Polyamides are sold in filament, tow and staple form. They are mainly supplied by ICI, Courtaulds, British Enkalon and Chemstrand. Acrylics are sold in tow and staple form mainly by Monsanto, Dupont and Courtaulds. Courtaulds sell in top form to any customer and in tow form solely to some vertically integrated worsted organisations.

*Waste*
Recovered waste is collected and sold to a marine store. After rough classification it is then either offered at the Dewsbury auctions or bought by a rag merchant for further grading. In either case it is subsequently bought by a mungo and shoddy manufacturer.

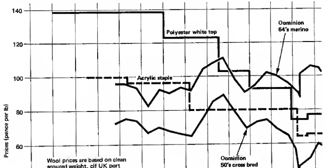


FIGURE 3.3 – RECENT HISTORY OF RAW MATERIAL PRICES

*Price fluctuations*

Figure 3.3 shows trends in price of a selection of different raw materials over the last few years. The figures plotted for wools are half-yearly averages on a clean scoured weight basis, cif United Kingdom port. The long-term decline in the price of the 50's quality, which is mainly from New Zealand, can be clearly seen.

The most significant feature of the figure is the marked decline in man-made fibre prices relative to wool prices. As man-made fibre production capacity grows it can be anticipated that this price trend will continue. The figures plotted are those quoted in the published price lists, and apply to orders for small quantities, discounts being allowed for larger orders.

Devaluation of the pound sterling in 1967 increased the price of wools imported from Australia, South Africa and South America, giving further advantage to home-produced man-made fibres. The increase was not, however, of the full order of the 14·3 per cent devaluation, since movements in the price of wool before and after November 1967 combined to move the raw wool price index up by only little over 5 per cent as a direct result of the devaluation.

# Chapter 4 Present structure of the industry

## 4.1 Establishments and organisations

For the purposes of this report, 'establishments' are defined as commercial or production units which have separate postal addresses and geographic or functional identities. They may be branches, departments, subsidiaries, parent companies or single independent companies. The word 'organisation' is used to describe any company or group of companies which is not controlled by any other company within the industry. This collective word is needed for analysis of integration in the industry.

The activities of both organisations and establishments may be single-sector (e.g. worsted spinning) or multi-sector (e.g. worsted spinning and weaving) and of course there are many permutations of multi-sector activities existing in the industry. Three basic divisions have therefore been adopted to describe the industry's structure, viz: single-sector establishments or organisations, multi-sector (integrated) establishments or organisations, and others.

Much of the analysis depends on comparative measurement of the sizes of these component units of the industry and a number of possible yardsticks could be used. The yardstick of size selected for this study is the number of employees in each establishment or organisation, largely because this statistical information is more accurate, more readily available and less liable to misinterpretation than other possible measures.

The statistics used in this chapter were obtained largely from the preliminary questionnaire. The usable returns represented employment of just over 131,000 or 91 per cent of WIBS's estimate of the total employment of the industry at that time. Very few medium or large size companies are known to have refused to participate in the study. It is thought that most of the establishments which are not represented are small and many of them are commercial, dormant or holding companies.

The estimated size distribution of establishments for the whole industry, grossed up from questionnaire returns, is given in the form of a histogram in Figure 4.1(a). Nearly 30 per cent of the establishments are merchanting or other commercial establishments and few of these employ more than about 30 people. Of the production establishments, 83 per cent have between 32 and 320 employees each. There are very few establishments with more than 1,000 employees.

Similarly the size distribution of organisations is shown in Figure 4.1(b). About three-quarters of all organisations have one establishment only. The remaining quarter share nearly half the total number of establishments. Whereas 80 per cent of the single-establishment organisations have fewer than 100 employees each and only 4 per cent have more than 320, about half of the multi-establishment organisations employ more than 100 and over a quarter employ more than 320.

Table 4.1 shows the variation in size distribution of establishments resulting from the analysis of questionnaire returns. These have not been grossed up to cover the whole industry, as the difference is small and to do so would introduce errors. In each division the size band containing the largest number of establishments is in bold figures and in most cases the average size will fall in the same size band. As would be expected, the integrated establishments are most frequently in a larger size band than single-sector establishments. The table also shows the preponderance of commercial establishments in the smallest sizes. It is noticeable that in most sectors the range of viable size is very wide. For example, worsted spinning establishments vary in size from below ten to near a thousand employees.

Table 4.2 shows the size distribution of organisations in the same divisions. The burling and mending sector is apparently anomalous as all the larger establishments fail to appear in

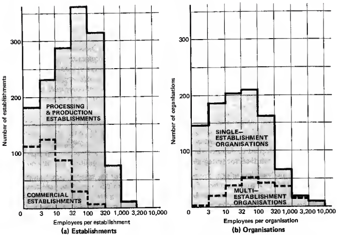


FIGURE 4.1 – SIZE DISTRIBUTIONS OF ESTABLISHMENTS AND ORGANISATIONS

Table 4.1 – Size distribution of establishments in the divisions

| | *Number of establishments answering the questionnaire* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Division* | *1-3 employees* | *4-10* | *11-32* | *33-100* | *101-320* | *321-1,000* | *1,001-3,200* | *3,201-10,000* | *TOTALS* |
| Combers and recombers | – | 2 | 3 | 12 | 23 | 2 | 1 | – | 43 |
| Worsted spinners | – | 1 | 8 | 36 | 65 | 16 | – | – | 126 |
| Woollen yarn producers | 1 | 6 | 9 | 32 | 13 | – | – | – | 61 |
| Worsted weavers | – | 6 | 16 | 50 | 34 | 4 | – | – | 110 |
| Woollen weavers | 4 | 3 | 17 | 26 | 9 | 3 | – | – | 62 |
| Integrated worsted mills | – | – | – | 6 | 19 | 13 | 5 | – | 43 |
| Integrated woollen mills | 2 | 3 | 11 | 41 | 85 | 21 | 1 | – | 164 |
| Woollen and worsted mills | – | 1 | 10 | 21 | 24 | 7 | – | – | 63 |
| Dyers and finishers | – | – | 21 | 47 | 20 | 1 | – | – | 89 |
| Rag and waste processors | 5 | 17 | 17 | 13 | – | – | – | – | 52 |
| Scourers and carbonisers | 2 | 7 | 7 | 6 | 1 | – | – | – | 23 |
| Burlers and menders | 2 | 20 | 28 | 11 | 1 | – | – | – | 62 |
| Topmakers | 4 | 6 | 16 | 5 | 2 | – | – | – | 33 |
| Merchants, brokers and stockists | 108 | 119 | 70 | 25 | 2 | – | – | – | 324 |
| Fellmongers | – | 7 | 12 | 14 | 1 | – | – | – | 34 |
| TOTALS | 128 | 198 | 245 | 345 | 299 | 67 | 7 | – | 1,289 |

Table 4.2. This is because many of the larger menders, although running separate establishments, are integrated with weaving organisations and therefore appear in the weaving divisions in Table 4.2. The smaller mending establishments are mostly independent.

Table 4.2 – Size distribution of organisations in the divisions

| *Division* | *Number of organisations answering the questionnaire* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *1-3 employees* | *4-10* | *11-32* | *33-100* | *101-320* | *321-1,000* | *1,001-3,200* | *3,201-10,000* | *TOTALS* |
| Combers and recombers | – | 2 | 2 | 4 | 5 | 4 | – | 1 | 18 |
| Worsted spinners | – | 1 | 3 | 21 | 30 | 8 | – | – | 63 |
| Woollen yarn producers | – | 3 | 6 | 17 | 7 | – | – | – | 33 |
| Worsted weavers | – | 3 | 10 | 31 | 10 | 1 | – | – | 55 |
| Woollen weavers | 2 | 3 | 10 | 13 | 3 | 1 | – | – | 32 |
| Integrated worsted organisations | – | – | – | 4 | 5 | 14 | 7 | – | 30 |
| Integrated woollen organisations | 2 | 3 | 8 | 29 | 62 | 18 | 3 | – | 125 |
| Woollen and worsted organisations | – | 1 | 8 | 14 | 11 | 12 | 7 | 3 | 56 |
| Dyers and finishers | – | 1 | 18 | 17 | 14 | 3 | – | – | 53 |
| Rag and waste processors | 3 | 12 | 14 | 9 | – | – | – | – | 38 |
| Scourers and carbonisers | 2 | 7 | 7 | 6 | 1 | – | – | – | 23 |
| Burlers and menders | 1 | 19 | 18 | – | – | – | – | – | 38 |
| Topmakers | 2 | 4 | 7 | 2 | – | 1 | – | – | 16 |
| Merchants, brokers and stockists | 100 | 95 | 59 | 14 | 2 | – | – | – | 270 |
| Fellmongers | – | 5 | 10 | 11 | 1 | – | – | – | 27 |
| TOTALS | 112 | 159 | 180 | 192 | 151 | 62 | 17 | 4 | 877 |

It should be borne in mind that these statistics are based on the numbers of establishments and organisations in each employment size band. Analysis of numbers of employees, assets or turnover in the same size bands would give different distribution patterns. For example, whereas the majority of integrated worsted establishments fall in the size band 101 to 320 employees, the greatest overall number of employees is in the size band 1,001 to 3,200 and the average number of employees per establishment is about 550.

WIBS figures for total number of companies (excluding commission burlers and menders) in the years 1964 to 1967 are as follows:

| | *Number of companies* | *Percentage fall from 1964* | *Percentage fall each year* |
|---|---|---|---|
| December 1964 | 1,405 | – | – |
| December 1965 | 1,335 | 5 | 5·0 |
| December 1966 | 1,237 | 12 | 7·4 |
| December 1967 | 1,143 | 18 | 7·6 |
| | *Number of personnel* | | |
| December 1964 | 168,507 | – | – |
| December 1965 | 163,168 | 3 | 3·0 |
| December 1966 | 153,650 | 9 | 5·9 |
| December 1967 | 143,224 | 15 | 6·8 |

Examination of the detailed statistics shows that, of the 262 companies which have gone out of business or been absorbed, about 200 had fewer than 100 employees and 28 more were in the size range 100 to 150 employees. The difference between the percentage reductions in the number of firms and their employment indicates some growth of the remainder at the expense of those which failed. Generally there is a perceptible tendency towards larger size, and for small companies to fail.

For comparison the statistics for the Canadian and US wool textile industries have been examined. Little change occurred in the number of establishments in Canada in the period 1961 to 1965. In the USA, however, there has been a considerable reduction, as shown below:

| | *Number of establishments* | *Percentage fall from 1947* | *Percentage fall each year* |
|---|---|---|---|
| 1947 | 930 | – | – |
| 1954 | 740 | 20 | 3·0 |
| 1958 | 700 | 25 | 1·4 |
| 1963 | 574 | 38 | 3·6 |

Although the American wool textile industry underwent a considerable reorganisation during the sixteen-year period shown, the annual rate of closure of establishments was about half of that experienced in the United Kingdom since 1964.

### 4.2 Horizontal and vertical integration within the industry

Horizontal integration is defined as the operation, under common ownership, of two or more establishments carrying out the same activity, or the acquisition of two or more such establishments with a view to amalgamating their resources into one. Different activities at the same level in the process stream, such as weaving and knitting, are not considered as examples of horizontal integration.

Vertical integration is defined as the operation of two or more separate, consecutive process stages in one or more establishments under a single ownership.

Analysis of Tables 4.1 and 4.2 shows the following ratios of establishments to organisations in the main divisions:

| *Division* | *Establishments* | *Organisations* | *Establishment per organisation* |
|---|---|---|---|
| Combers and recombers | 43 | 18 | 2·4 |
| Spinners | 187 | 96 | 2·0 |
| Weavers | 172 | 87 | 2·0 |
| Dyers and finishers | 89 | 53 | 1·7 |
| Integrated worsted mills | 43 | 30 | 1·4 |
| Integrated woollen mills | 164 | 125 | 1·3 |

These figures have been analysed further to distinguish between the woollen and worsted systems, and it is found that there is scarcely any difference in the extent to which they are integrated horizontally.

It has been pointed out above, with reference to Figure 4.1(b), that about three-quarters of all organisations have one establishment only. The details are as follows:

668 organisations consist of one establishment each;
209 organisations share 621 establishments; i.e. multi-establishment organisations have, on average, three establishments each.

This provides only a very approximate picture of horizontal integration. Firstly, the ratios above are only of real use in the single-activity sectors, as the vertically-integrated organisations can include integrated or single-activity establishments. Secondly, the questionnaire revealed a few organisations which consist of more than ten establishments and several between five and ten. However, these figures do provide the average ratio of establishments to organisations in each of the activities shown and a crude indication of the extent of horizontal integration.

Vertical integration is much more common in the woollen system than in the worsted system. This is demonstrated in Table 4.3 which shows, for each system, the percentage number of establishments and organisations carrying out one, two, or more than two activities. Eighty per cent of the worsted sytem is non-integrated vertically, whereas substantially over half of the woollen system is to some extent integrated vertically.

Table 4.3 – Vertical integration in the industry

| | *Percentages* | | | |
|---|---|---|---|---|
| | *One activity* | *Two activities* | *More than two activities* | *TOTAL* |
| *Worsted system:* | | | | |
| Establishments | 80 | 16 | 4 | 100 |
| Organisations | 82 | 14 | 4 | 100 |
| *Woollen system:* | | | | |
| Establishments | 43 | 38 | 19 | 100 |
| Organisations | 34 | 44 | 22 | 100 |

The difference between the woollen and worsted systems is rather greater than is shown in Table 4.3. Many integrated spinner-weavers buy part of their yarn requirements from elsewhere, but generally woollen manufacturers spin a larger proportion of their own requirements than do integrated worsted manufacturers. Secondly, some integration in the woollen system is not shown in the table; for example some woollen manufacturers are fully integrated from rag-pulling to finishing, including dyeing.

There are several reasons for this difference in structure between the two systems. In the worsted system, a combing establishment of economic size, with the associated sorting, scouring and carding processes, produces enough tops for several spinning establishments. On the other hand, worsted spinners supply only about 40 per cent of their output to the weaving sector, the remainder being hosiery, hand knitting and carpet yarns, and many prefer to spread their business between two or more types of customer. At the same time they can pass back to the comber some of the risks associated with fluctuating wool prices. The worsted weaver generally uses a wider variety of yarn qualities than could be spun economically by a single spinner and therefore prefers the commercial freedom of non-integration. Worsted cloth also requires a number of specialised finishing operations and, except in the fine Huddersfield trade, worsted manufacturers generally do not do their own finishing. In the present trading situation therefore, there is little incentive for vertical integration in the worsted system.

In the woollen system on the other hand, the output levels of economic process units are much more alike. The design, costing and quality control of woollen cloth depend to an important extent on the proper blending of a variety of raw materials and the manufacturer's profitability depends on his skill in these crafts as much as on his production efficiency. The design of woollen cloths also depends largely on their colour and finish. Woollen finishing plant is less complex and more adaptable than worsted finishing plant and many woollen weavers are therefore integrated forwards into finishing as well as backwards into spinning and material preparation. Some of the non-integrated woollen mills are spinners of woollen yarns for hosiery, hand knitting or carpets, and there are some non-integrated weavers of speciality tweeds, etc. Apart from these, the majority of woollen mills are to some extent integrated.

There has been a trend to increasing integration in the worsted system due to the growth of large multi-establishment organisations. However, this bas often not resulted in the formation of integrated establishments and, for example, weaving mills in integrated organisations may be free to buy all or part of their yarn requirements from outside the organisation.

This trend has gone to an extreme situation in the USA where the worsted organisations are very largely integrated. There are now only six important worsted manufacturing organisations and these are all integrated. They have also diversified into the cotton and man-made fibre industries, and the second-largest worsted organisation is also the largest woollen manufacturer. However, even in this highly-integrated industry there are still a few important specialist combers. Generally, the integrated organisations consist of a fairly large number of relatively small and specialised establishments.

### 4.3 Relationships with other industries

The questionnaire returns and other sources of information have been examined to determine the extent to which companies in the wool textile industry are controlled by other companies outside the industry. It is found that about sixty companies are either subsidiaries of companies which are outside the industry or of companies which are themselves subsidiaries of such companies. At least twelve merchants, one spinner and one weaver are subsidiaries of foreign companies. Of the remainder, two are subsidiaries of London retail stores, two of large conglomerate companies, at least one is controlled by a piece-goods merchant, several woollen spinners are controlled by carpet manufacturers, several mills are owned or controlled by a large distributive chain, and thirty-six companies are known to be controlled by three large groups whose main interests are in cotton and man-made fibres. One company is a subsidiary of a Dundee jute company.

Apart from control by majority ownership some other companies in the industry are subject to control of a different sort when they are largely dependent on another company for supplies or for sales. To some extent this situation is not uncommon within the industry. It is of greater importance in the relationships between some companies in the industry and their suppliers of man-made fibres. Generally the relationship is mutually advantageous and is sometimes reinforced by minority shareholders and financial support, but there have been instances when changes of policy by tbe fibre supplier have had serious consequences for some of the users.

About a dozen companies in the industry are known to be engaged wholly or partially in various forms of weft knitting, including making-up garments from knitted cloth. Others are making clothing accessories such as ties, scarves, etc. In these instances the industry has secured for itself, in an ownership capacity, small parts of the hosiery and clothing industries. Some were probably keen to control parts of their markets for yarn or cloth; others diversified profitably into related, growing businesses.

A considerable number of companies in the raw material buying activities have subsidiary or associated companies in other countries and there are a few production subsidiaries and associates abroad. For merchants and brokers, sucb associations in the countries supplying raw materials can provide important commercial advantages. On the other hand production ventures overseas have often been speculative investments and some at least have proved unsuccessful.

Finally tbere are sectors whose processes or products are or can be of use in other countries. Dyers, finishers and perhaps menders are in a position to undertake work for customers in other textile industries and many do so. Fellmongers are equally concerned with the sale of skin wool to the wool textile industry and the sale of hides to the leather trade. Grease is still a valuable by-product of scouring and is of particular importance to the cosmetics industry.

The relationships mentioned above concern only a minority of companies in the industry. Most have no fixed associations with other industries apart from their normal selling relationships with their customers. The smallness of the industry's involvement in the hosiery trade is particularly surprising in view of its rapid growth and close contact with the spinning sectors.

### 4.4 Pattern of ownership

Statistics are available to show the relative numbers of public companies and private companies in the industry. Unfortunately, the figures for private companies are not analysed further to show the numbers of close companies, partnerships, proprietorships or subsidiaries. The present percentage distribution of public and private companies in broad size categories is given in Table 4.4, with the corresponding percentage distribution of employees.

Table 4.4 – Public and private companies in the industry

| *Size range (employees in company)* | *Percentage of companies* | | *Percentage of employees* | |
|---|---|---|---|---|
| | *Public companies* | *Private companies* | *Public companies* | *Private companies* |
| 0-199 | 2 | 85 | 1 | 24 |
| 200-499 | 2 | 6 | 6 | 15 |
| 500-999 | 2 | 1 | 10 | 5 |
| 1,000 and over | 2 | 0 | 37 | 2 |
| TOTAL | 8 | 92 | 54 | 46 |

Only 8 per cent of all companies in the industry are public companies, but they employ about 54 per cent of all employees in the industry. Since 1964, the total number of private companies has fallen by about 21 per cent. This fall has been spread across all sizes of companies and, in the same period, the number of employees in private companies has fallen by about 28 per cent, indicating a reduction in the average size of private companies. Since 1964, the number of public companies has increased by about 20 per cent, while the number of their employees has fallen by less than 2 per cent.

There has been a perceptible change in the size distributions of public and private companies in the four years from 1964 to 1967, as shown in Table 4.5.

Table 4.5 – Trends in company status

| *Size range (employees in company)* | *Percentage of public companies* | | *Percentage of private companies* | | *All companies* | |
|---|---|---|---|---|---|---|
| | *1964* | *1967* | *1964* | *1967* | *1964* | *1967* |
| 0-199 | 13 | 23 | 91 | 93 | 87 | 87 |
| 200-499 | 26 | 30 | 7 | 6 | 8 | 8 |
| 500-999 | 33 | 21 | 2 | 1 | 3 | 3 |
| 1,000 and over | 28 | 26 | small | small | 2 | 2 |
| TOTAL | 100 | 100 | 100 | 100 | 100 | 100 |

In both categories of companies there is an apparent trend to smaller sizes. However, the overall average size has increased slightly, and, as was pointed out in Article 4.1 above, about 76 per cent of all the companies which went out of business or were absorbed into larger companies had fewer than 100 employees. The relatively rapid disappearance of small companies has been accompanied by transfer of some companies from private to public status and the size distribution of all companies together has remained constant.

### 4.5 Geographical distribution

Questionnaire returns show the present distribution to be as follows:

| | *Percentage of establishments* |
|---|---|
| Yorkshire and North England | 78·0 |
| Scotland | 12·0 |
| West of England | 2·5 |
| Wales and the rest of England | 7·5 |
| | 100·0 |

Fully-integrated establishments can exist economically in isolation, whereas a high degree of fragmentation tends to favour regional concentration. For this reason the worsted sectors, 80 per cent of which are shown in Article 4.2 above to be entirely non-integrated, are closely concentrated in the Bradford area with the commission processors who serve them. Woollen mills are much more widely scattered, although there are local areas of concentration such as Galashiels, Selkirk, Hawick and Huddersfield. About a third of all Scottish mills are fully-integrated vertically and many of the remainder are partially-integrated. Companies dealing in and processing rags are almost all in the 'heavy woollen' area of the West Riding, close to the majority of their principal customers. Commercial establishments are found in several cities such as Liverpool, Glasgow, Manchester and Leeds but over eighty per cent are concentrated in London and the Bradford area.

Within the major sectors some regional concentration of products is found. Huddersfield is the centre of the fine worsted trade, and Morley and Dewsbury of the 'heavy woollens', while the West of England mills produce a number of speciality woollens and worsted for apparel and non-apparel use.

The largest organisations in the industry have establishments in widely separated areas. However, there are a few substantial organisations which are largely confined to Yorkshire and surrounding counties. The majority of multi-establishment organisations consist of only two or three establishments, and most of these have their establishments close to each other.

This regional concentration has allowed consecutive processes to be carried out in separate establishments without incurring excessive extra costs in packaging and transport. It has also resulted in the wool textile industry being the principal employer in some of these areas, and particularly in some towns within the areas. The accumulated skills and traditions in these textile towns have been of great value to the industry in the past. Faster road transport and a tendency to integration are now reducing to some extent the economic importance of proximity to other processors. At the same time, government policy and the growth of other industries competing for the same labour are tending to encourage managements to consider moving to development areas.

### 4.6 Central services of the industry

Considering that the industry consists mainly of small individualistic companies competing actively with each other, its history of co-operation and progressive attitudes in organising its own central organisations are probably unique in British industry. Most companies in the industry are too small to undertake alone such activities as research, development of plant or new techniques, training or export promotion. Recent years have seen great technological changes and rapid development of management methods and at the same time, important changes in international trade. It is therefore essential that the industry's co-operative services should be used to the best possible effect.

There are various ways in which such service organisations can be financed. Where it is considered important that all companies should be obliged to contribute according to prescribed formulae, collection of a statutory levy is an effective if rather inflexible means. If compulsory contribution cannot be justified, equitable subscriptions can be arranged through the representative bodies. This is a more flexible arrangement as the amount can be varied freely by common agreement, but it fails to involve non-federated organisations. Alternatively, some service functions can be supported by associations of member-subscribers, but in such cases members are entitled to claim exclusive rights to the services. Finally, for certain types of services, direct payment by each user according to the cost of the services rendered is the most appropriate. It should be noted that government subsidies are most likely to be associated with compulsory industry-wide financing arrangements.

The current contributions by the industry to its central services and principal representative organisations are as follows:

| | *Annual contribution* £ |
|---|---|
| Delegation and Employers' Council | 20,000 |
| Central Press Office | 11,000 |
| National Wool Textile Export Corp. (NWTEC) | 180,000 |
| Wool Industry Bureau of Statistics (WIBS) | 13,000 |
| Wool Industries Research Association | 280,000 |
| Wool, Jute and Flax Industry Training Board (WITB) | 120,000 (administration) |
| | 624,000 |
| Management Services Centre (MSC) | 85,000 (fees) |
| | 709,000 |

This is equivalent to 0·2 per cent of the industry's turnover and 0·4 per cent of its total added value.

The Delegation and Employers' Council are considered in Article 4.7 and the central service bodies are described in turn below.

*Central Press Office*
This office handles the industry's publicity and publications. It issues press releases, circulates a quarterly bulletin to people with interest in the industry such as Members of Parliament, Universities and government departments, and issues publicity magazines abroad. It services NWTEC, supplying overseas agents with articles, photographs and other promotional material and publishes a monthly fashion news bulletin. It organises press functions, maintains contact with publicity media, organises visits to the industry and generally provides an information service about the industry for outside enquiries.

The office is financed as follows, apart from small contributions from WIRA and the Management Services Centre:

50 per cent from NWTEC
30 per cent from the Delegation
20 per cent from the Employers' Council

It is controlled and directed by the industry through the Delegation and Employers' Council. Relationships with the industry are excellent and the Office provides a valuable service.

*National Wool Textile Export Corporation and Export Group,*
*National Wool Textile Executive*
These bodies are financed jointly by a statutory levy on the industry, based four fifths on the number of employees and one fifth on the quantity of wool dealt in by each subscriber.

The two organisations are administered jointly and share one office and staff in Bradford. The Export Group comprises representatives of all those sections of the industry concerned largely with export, while the Corporation combines all the interests of the whole industry. The functions are of three types, i.e. to promote the industry's exports of tops, yarns or cloth; to protect British interests in the matters of patents, trade marks, misrepresentation, etc.; and to represent them at tariff hearings abroad and in negotiations with British government departments.

On the present basis, the levy raised by the Board of Trade is likely to yield £700,000 for promotion in the next five years, after providing administrative expenses of about £35,000 a year. Considerably more than £700,000 will accrue if the Delegation's request for a revised basis is allowed. The amount is spread over twenty markets and, even when supplemented by matching contributions from the Board of Trade and/or customers in overseas countries, the promotional coverage is rather thin. It is felt that, within the budgetary limitations, the service provided has been excellent.

*Wool Industry Bureau of Statistics*

The Bureau collects statistical information from the industry and publishes the processed figures in monthly bulletins. It usually gets more than 90 per cent response to its requests for information. Besides publishing information for general use, the Bureau also supplies statistics to the Board of Trade and to the Delegation or other central organisations for negotiations or for survey work. Information is also made available to the International Wool Textile Organisation, the International Wool Secretariat and the Training Board.

Apart from nominal payments by the Training Board, the Bureau is financed by the Delegation and the Employers' Council, and is controlled by the Statistics Committee of the Delegation. The industry itself, through its representative federations, controls the subject matter of the statistics, and their usefulness is limited by the amount of information companies are prepared to supply and the extent to which they instruct the Bureau to interpret them. Within its terms of reference the Bureau provides a useful and inexpensive service. If the Bureau did not supply suitable statistics to the Board of Trade voluntarily, they would probably have to be collected under statutory powers. There is little doubt that the Bureau could produce more statistics with a greater degree of interpretation, for little if any additional expense.

*Wool Industries Research Association*

The WIRA Council consists of 43 representatives, 23 of whom are appointed by the federations, 8 by outside bodies such as universities, trades unions and the IWS, and 5 by non-federated companies. The remaining seven members are co-opted. The WIRA Council therefore represents the industry as a whole and is responsible for maintaining communications with the industry, government and interested outside bodies. The Council appoints a Board of Management which is similarly representative. The Chairman and Director of WIRA, with those of the Hosiery and Allied Trades Research Association and the Shirley Institute, comprise the Nottingham Committee. The Chairmen and Directors of the seven textile research associations comprise a Standing Consultative Committee which is directly associated with a Standing Conference of the Confederation of British Industries. The organisation therefore is designed to ensure that WIRA is fully in touch with the industry and with other textile industries and all organisations which might have similar interests.

WIRA's research interests include basic research into the properties of wool fibres, investigations and development of new processes and products, including testing methods, development of new machines to do traditional functions, and management techiques. Under the new Articles of Association, textile machinery makers, clothiers, fibre producers and carpet manufacturers are entitled to full membership facilities and services. Except in cases where research projects are sponsored by individual companies, the results of all researches are generally available to the whole industry. However, to ensure efficient dissemination of information in the industry and to collect feed-back and new enquiries, WIRA's second principal activity is its Member Services section. This communication function is considered to be very important and a substantial share of the available resources is devoted to it.

Finances for WIRA are secured largely through a statutory levy, based on employment and fibre usage, and by grants from the Ministry of Technology. Levy income is now about £280,000 a year, out of a total budgetted requirement of about £430,000. Apart from financing its own affairs, WIRA has a responsibility for some research in universities and technical colleges and the amount allocated annually to these has averaged about 10 per cent of the levy income. Membership of the Association is voluntary but all companies who pay the levy are entitled to membership and, on registration, receive all the available services. It is reported that there are about 1,200 members. In addition to general information services, members can obtain testing services and private research services on a fee basis; current income from fees and sponsored projects represents less than 10 per cent of WIRA's annual income.

To obtain the most economic use of resources it is important to obviate duplication witb work being done elsewhere. The most likely overlap of interests is in the development of computer applications, where research into industry-wide applications may conflict with the MSC's consultancy function of introducing computer utilisation to individual companies. Similarly, there are potential areas of overlap with the IWS. However, a member of the IWS and the Principal of the MSC sit on the WIRA Council and this should be sufficient safeguard against such conflict.

Attitudes to WIRA in the industry are various, but it is apparent that the Association bas done much good work and that the industry is in a position to direct its policies through the representative organisations. It has been stated that a company must have at least 500 employees and a turnover of £1 million to support effectively its own research and development. Very few companies in the industry would have access to any such facilities in the present circumstances except through a central organisation such as WIRA.

*Wool, Jute and Flax Industry Training Board*

This training board was formed to ensure an adequate supply of trained labour, to ensure efficiency in training and to share the cost of training equitably throughout the industries named. In addition it has taken steps to examine and offer advice on problems of recruitment.

Although the Board includes equal numbers of employers' and union representatives from the industry, they serve in individual capacities and the Board is responsible only to the Department of Employment and Productivity. The eleven Industrial Committees, which represent the wool textile industry, are composed of federation and union representatives and there are also Regional and Area Committees of the Board. Their functions are to recommend grants and training schemes and to stimulate their use.

The Board is financed by a statutory levy. The levy yields about £1·3 million a year, of which the annual cost of administration is about £120,000. The balance is distributed in the form of grants to offset partially tbe costs of approved training courses. Details of claims and grants in a typical year are given above in Article 2.5.

This was the first board to be set up under the Industrial Training Act, 1964 and it undoubtedly performs a very important function. However the industry's relationship with the Board is not entirely happy. The organisation of committees is intended to involve the federations and unions and to ensure that the industry's views are known. Many members of the industry do not find this satisfactory. The wool textile industry has an impressive record of management of its own central services and there is a significant weight of opinion that it should have more direct control of its own training arrangements.

### *Management Services Centre*

The MSC was started by the Wool (and Allied) Textile Employers' Council in 1954 as a Work Study Centre concerned largely with productivity. Later it widened its scope and changed its name and it now offers a wide range of consultancy services on a non-profit-making fee basis. In addition to management consultancy, the MSC trains work-study engineers at the rate of forty-two per year in 12-week courses.

The annual budget of the Centre is now about £85,000, of which about 90 per cent is derived from consultancy fees and about 10 per cent from net income from training courses. There are 26 consultants on the staff and in 1967 they did consulting work for 115 companies. Most of the work is done in the wool textile industry and the staff are therefore highly specialised in the industry's problems. Considering the non-profit-making fee system, the services provided must generally be very good value to client companies.

A large proportion of the Centre's work is still concerned with work-study, productivity, incentive schemes, etc. and the Centre has established a good co-operative relationship with the unions, with whom methods and implementation are discussed before changes are recommended.

Recently an important new step has been taken in carrying out an inter-firm productivity comparison in the Huddersfield fine worsted mills. This was very successful and has already led to similar surveys in other sectors, as described in Article 2.4.

Close contact is being maintained with WIRA to resolve any overlapping of interests which may arise, particularly in the growing computer field. It is difficult for a non-profit-making organisation to allocate resources to development work, but it may be necessary to make this possible in future, if the MSC is to provide a full range of management consultancy in systems analysis, computer programming and other specialised areas of management.

### 4.7 Employers' Associations

The structure of the industry's central organisations is illustrated in Figure 4.2. The principal representative bodies are shown with their constituent specialised federations and unions. The main connections between them and the industry's own service organisations are indicated, and the important associations and connections with organisations outside the industry are shown at the bottom of the illustration.

There are three levels of representation for many companies in the industry. Manufacturers and worsted spinners are represented by district federations and associations which are members of the Woollen and Worsted Trades' Federation and the Worsted Spinners' Federation Ltd respectively. The district federations are not shown in Figure 4.2. The thirteen federations shown appoint members of the Delegation approximately in proportion to their size. Seven of the federations, representing about 80 per cent of the industry's man-power, also provide the membership of the Employers' Council.

In addition to the associations and federations affiliated to the Delegation, there are a number of other trade associations in the industry. Generally they have more specialised functions, in many cases concerned with promotion or the representation of producers of defined products.

The Wool Textile Delegation was formed in 1921, and its principal purpose is to serve as an authoritative means of communicating between the industry and government departments and other important outside organisations. It deals with a variety of subjects and, for example, has recently represented the industry to the Monopolies Commission concerning mergers, to the Board of Trade regarding the Anglo-Japanese Trade Treaty, and to the Yorkshire River Authority on the subject of industrial effluents.

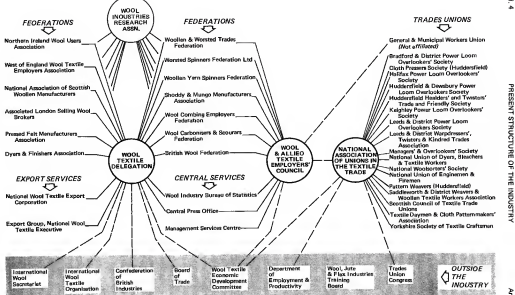

WOOL INDUSTRIES RESEARCH ASSN.
FEDERATIONS
Northern Ireland Wool Users Association
West of England Wool Textile Employers Association
National Association of Scottish Woollen Manufacturers
Associated London Selling Wool Brokers
Pressed Felt Manufacturers Association
Dyers & Finishers Association
EXPORT SERVICES
National Wool Textile Export Corporation
Export Group, National Wool Textile Executive
WOOL TEXTILE DELEGATION
FEDERATIONS
Woollen & Worsted Trades Federation
Worsted Spinners Federation Ltd
Woollen Yarn Spinners Federation
Shoddy & Mungo Manufacturers Association
Wool Combing Employers Federation
Wool Carbonisers & Scourers Federation
British Wool Federation
CENTRAL SERVICES
Wool Industry Bureau of Statistics
Central Press Office
Management Services Centre
WOOL & ALLIED TEXTILE EMPLOYERS' COUNCIL
NATIONAL ASSOCIATION OF UNIONS IN THE TEXTILE TRADE
TRADES UNIONS
General & Municipal Workers Union (Not affiliated)
Bradford & District Power Loom Overlookers' Society
Cloth Pressers Society (Huddersfield)
Halifax Power Loom Overlookers' Society
Huddersfield & Dewsbury Power Loom Overlookers Society
Huddersfield Healders' and Twisters' Trade and Friendly Society
Keighley Power Loom Overlookers' Society
Leeds & District Power Loom Overlookers Society
Leeds & District Warpdressers', Twisters & Kindred Trades Association
Managers' & Overlookers' Society
National Union of Dyers, Bleachers & Textile Workers
National Woolsorters' Society
National Union of Enginemen & Firemen
Pattern Weavers (Huddersfield)
Saddleworth & District Weavers & Woollen Textile Workers Association
Scottish Council of Textile Trade Unions
Textile Daymen & Cloth Patternmakers' Association
Yorkshire Society of Textile Craftsmen
International Wool Secretariat
International Wool Textile Organisation
Confederation of British Industries
Board of Trade
Wool Textile Economic Development Committee
Department of Employment & Productivity
Wool, Jute & Flax Industries Training Board
Trades Union Congress
OUTSIDE THE INDUSTRY

FIGURE 4.2 – THE CENTRAL ORGANISATIONS OF THE INDUSTRY

The Employers' Council deals with negotiations on wage rates, working conditions, productivity schemes and safety, but only for the Yorkshire section of the industry. Negotiations are conducted mainly with the National Association of Unions in the Textile Trade and the General and Municipal Workers Union. The negotiating procedure has worked so well that there has been no major dispute in the industry for about forty years, a record of which the industry can be justifiably proud.

The Delegation and the Council share offices in Bradford. They have separate permanent staffs who maintain close contact with each other. Also there are normally a number of representative members who are common to both bodies. There is therefore very effective informal communication between them.

Of the service organisations, the Management Services Centre is responsible to the Council, while responsibility for the Bureau of Statistics and the Central Press Office is shared. The Export Corporation and the Export Group are primarily responsible to the Delegation and WIRA is connected to the Delegation through the federations by common memberships.

The thirteen member federations and associations are responsible for looking after the interests of their members generally and for representing their views to the Delegation or the Council. They are concerned with wage negotiations and industrial or commercial matters of interest to their members. Most of them can claim membership of at least 90 per cent of the companies that are eligible. The district federations of manufacturers and spinners have similar functions and serve a useful purpose in disposing of many problems and negotiations at the local level. The companies in each sector can organise their federations by common agreement to meet the changing circumstances of the industry and generally the arrangement works very well.

The annual income of the Delegation is approximately £27,000–of this, about a third is required for staff salaries and 40 per cent for the Bureau of Statistics. The financing of the Central Press Office is shared with the Council and with NWTEC and all administration is shared with the Council. The Council's income is about £12,000. The actual cost of administering the Delegation and Council together is only about £20,000 a year. The federations are run economically, and the total cost of representation is therefore small in relation to turnover. The main cost is a hidden one, namely the time spent by a considerable number of the ablest men in the industry on the industry's affairs.

There are two international organisations whose affairs are important to the industry, namely the International Wool Secretariat and the International Wool Textile Organisation. The former is concerned with promoting and developing the use of wool throughout the world, and is financed by the wool growers in Australia, New Zealand and South Africa. The IWS carries out the finances research. It contributes to WIRA and an IWS member sits on the WIRA Council. Its Technical Centre at Ilkley also keeps in close touch with WIRA in Leeds. The Woolmark symbol is used extensively on those products of the industry which are eligible.

The IWTO is an association of organisations in many member countries concerned with processing or trading in wool and allied fibres or their products. Its functions are to maintain connections between the wool textile organisations of the member countries, to represent the trade and industry in all branches of economic activity, to promote, support or oppose measures affecting the trade and industry, to promote the study and solution of relevant economic or commercial problems, to collect and disseminate statistical and other interesting information, to ensure the functioning of the International Wool Arbitration Agreement, etc. The industry is well represented on the UK Committee of the IWTO and the Director of NWTEC is also Secretary-General of the IWTO.

## 4.8 Trades Unions

There are sixteen trades unions drawing members from employees in the wool textile industry. Fifteen of these are specialist textile trades unions and are affiliated to the National Association of Unions in the Textile Trade (NAUTT). The General and Municipal Workers Union has members in the woolcombing sector in addition to a large membership in other industries. There is little organised representation of clerical and administrative workers in the industry.

The NAUTT negotiates industry-wide agreements on minimum wages, working conditions, safety, etc. with the Employers' Council. It is rare for these two central bodies to be involved in disputes. Only about 2 per cent of the employees in the industry are on minimum wages and most negotiation of actual wage rates is carried out by union branches at mill level. Disputes are often settled in the mill, failing which they are referred successively to district and unions levels corresponding to district and federation levels on the employers' side. The large proportion of 'plant bargaining' is widely regarded as advantageous to both employers and employees, and the good record of industrial harmony is at least partly attributable to it. However, it has been suggested that increasing concentration and integration in the industry, and possible blurring of the boundaries with other industries, will call for stronger and more centralised bargaining.

The unions have different criteria for eligibility and the membership coverage varies quite widely. It is estimated that over 90 per cent of those eligible join the craft unions and over 50 per cent of the remainder join the general unions. The total membership is estimated to be about 65,000 out of approximately 110,000 potential members.

The unions are individually members of the TUC and the NAUTT has a representative on the General Council of the TUC. The unions are financed by subscriptions of one shilling a week from each member, and the NAUTT receives affiliation fees from the unions. The NAUTT operates very economically by sharing expenses with the largest of its members, the National Union of Dyers, Bleachers and Textile Workers.

# Chapter 5 Finance and profitability

## 5.1 The assets of the industry

The previous chapters have detailed the quantity and age of plant existing in the industry, the number of establishments, the levels of stocks and the production levels. In this chapter such physical descriptions are estimated in terms of the capital worth of the industry and the return it obtains on that capital. The major source for this information is the Financial Questionnaire despatched to every firm in the industry in April 1968, in which detailed questions were asked concerning assets and liabilities, sales revenue, profit appropriations and investment. Usable returns received from 251 organisations provided data covering about 56 per cent of the total employment of the industry in the first quarter of 1968, a coverage which was believed to provide a sufficiently representative sample of the industry and its parts. The returns were, therefore, scaled up in the ratio of total employment to employment covered both for the industry as a whole and for those divisions where such information was known, the close agreement between the sum of the sectors and the scaled up total providing the first check on the accuracy of the analysis. Subsequent checks on certain figures were obtained from independent analyses of company data, from stockbrokers' reports, and from certain Census of Production figures. The reservations concerning those areas of the analysis where no checks could be made are discussed at the appropriate places in this chapter.

The book value of the industry's assets in the financial year 1967/68 is tabulated in Table 5.1. The divisions listed correspond roughly to the major activities of the organisations included, but certain qualifications are worth mentioning. The category of worsted spinners includes both a few organisations who spin both woollen and worsted yarns and also the larger number of spinners who operate combs as well. Integrated worsted organisations chiefly spin and weave on the worsted system, but could similarly undertake their own combing or recombing as well as their own dyeing and finishing. Integrated woollen organisations are similarly basically woollen spinning and weaving organisations. The category of merchants and topmakers includes all companies with no plant for the other processes listed; the returns from companies in this division were so scarce that generally throughout this chapter any figures relating to merchants and topmakers are obtained by the difference between the sum of the other sectors and the estimate for the whole industry.

The high level of working capital in the industry is clearly shown in Table 5.1, as is the preponderance, in terms of total asset value, of five divisions, combers and recombers, worsted spinners, integrated woollen organisations, woollen and worsted organisations, and merchants and topmakers, although the fixed assets of the latter are very small. The proportions of total assets held in stocks and work in progress vary considerably between divisions, organisations in the merchants and topmakers division having the highest stock ratio and those in the dyeing and finishing division the lowest. The quantity of cash held by the industry is very low, at below 3 per cent of total assets, the worsted spinning and integrated woollen divisions alone having significantly large cash balances. It will be shown in Article 5.5 that a shortage of internally-generated cash has typified the industry throughout the last five years.

Although book value is the conventional measure by which the worth of a company is measured, it would be useful in this study to estimate the worth of the industry against other yardsticks. From replies to the Financial Questionnaire it has been estimated that the book value of property in the industry, which includes land and buildings, is just over 20 per cent of the cost of the equivalent new property; similarly, the book value of plant is on average

Table 5.1 – Book value of the industry's assets

| | *Book value of assets in 1967 (£ million)* | | | | | | |
|---|---|---|---|---|---|---|---|
| | *Fixed assets* | | *Other long-term assets* | *Current assets* | | | |
| *Division* | *Plant* | *Property* | | *Cash and near cash* | *Stocks and work in progress* | *Debtors and others* | *TOTAL* |
| Combers and recombers | 6·6 | 4·1 | 4·0 | 0·2 | 23·3 | 9·4 | 47·6 |
| Worsted spinners | 21·9 | 10·3 | 2·3 | 4·0 | 37·3 | 18·5 | 94·3 |
| Woollen yarn producers | 6·5 | 3·6 | 0·5 | 0·7 | 6·1 | 7·1 | 24·5 |
| Worsted weavers | 1·3 | 1·3 | 0·8 | 0·9 | 6·1 | 3·1 | 13·5 |
| Woollen weavers | 1·2 | 0·7 | 0·6 | 0·7 | 2·4 | 1·4 | 7·0 |
| Integrated worsted organisations | 4·3 | 1·8 | 0·8 | 0·1 | 11·0 | 4·5 | 22·5 |
| Integrated woollen organisations | 10·3 | 6·7 | 2·2 | 3·1 | 20·9 | 11·3 | 54·5 |
| Woollen and worsted organisations | 14·9 | 7·8 | 6·7 | 1·0 | 38·8 | 14·5 | 83·7 |
| Dyers and finishers | 9·5 | 5·3 | 0·5 | 0·9 | 4·5 | 6·8 | 27·5 |
| Rag and waste processors | 1·0 | 0·5 | 0·3 | 0·1 | 2·4 | 1·5 | 5·8 |
| Scourers and carbonisers | 0·5 | 0·7 | 0·7 | 0·2 | 1·7 | 1·4 | 5·2 |
| Merchants and topmakers | 2·3 | 1·3 | 3·9 | 0·8 | 37·8 | 9·5 | 55·6 |
| WHOLE INDUSTRY | 80·3 | 44·1 | 23·3 | 12·7 | 192·3 | 89·0 | 441·7 |

just below 25 per cent of its replacement cost. The value of the industry measured in terms of the cost of reinstating the fixed assets is, then, about £870 m, or nearly double its present book value. The break-up value of the industry can only be estimated by consideration of the actual saleable assets; the sale value of assets other than fixed assets should correspond roughly to their book value, that of property is unlikely to exceed a quarter of its book value, and that of plant, basing the estimate on the unlikely assumption of the entire industry being scrapped, could be expected to be around 10 per cent of its book value. The scrap value of the industry would, therefore, be around £330 m.

The growth of the assets of the industry over the last five years is shown below, movements in asset value of less than 1 per cent annually being defined as 'slight':

| *Division* | *Growth in unadjusted book values (per cent)* | *Growth in book values at constant prices (per cent)* |
|---|---|---|
| Combers and recombers | 2·8 | Nil |
| Worsted spinners | 1·6 | −1·0 |
| Woollen yarn producers | 10·0 | 7·3 |
| Worsted weavers | 2·0 | Slight decline |
| Woollen weavers | 5·1 | 2·3 |
| Integrated worsted organisations | 5·1 | 2·3 |
| Integrated woollen organisations | 3·6 | Slight growth |
| Woollen and worsted organisations | 3·2 | Slight decline |
| Dyers and finishers | 6·7 | 3·9 |
| Rag and waste processors | 1·5 | −1·0 |
| Scourers and carbonisers | 1·7 | Slight decline |
| Merchants and topmakers | Slight decline | −3·0 |
| WHOLE INDUSTRY | 3·1 | Slight growth |

In the left-hand column of figures is shown the average annual rate of growth of the book value of assets as shown in the questionnaire returns. For the right-hand column, however, the annual values for the years before 1967 have been corrected for inflation, each year's results being converted into their equivalent value in terms of the £ as defined in the preamble of the Report. The resulting rates of growth indicate that over the period 1963-1967 the industry showed an insignificant growth above the loss of value of the pound, and that only four divisions showed any appreciable growth in assets. It must be realised, moreover, that these figures apply only to the industry as it is now, based on the companies still in existence. If the total asset value per man is assumed to have been constant over the period 1963-1967, and the manpower of the industry in 1963/64 is taken at 166,000, compared with 144,000 at the time of the financial year 1967/68, the book value of the industry's assets in 1963 would be about £510 m, resulting in a decline over the period of nearly 3 per cent annually. This rate of decrease would be reduced if the capital per man is assumed to have increased over the period, but the general picture of a significant decline in asset value is unlikely to change. During this period there was little significant change in the proportions of each main category of assets of responding companies, and there is no reason for assuming different proportions for the whole industry including companies now defunct.

One of the ways in which the questionnaire returns could be divided was by geographic regions, basing the sub-division on the location of the major part of a company's activities. The difficulty of scaling up the results was compounded by the fact that in several cases organisations had substantial shares of their activities in at least two of the three regions into which the returns could be split—Wales and the West Country, Scotland, Ireland and the Northern Development Area, and Yorkshire, the latter area including the few activities in London, Lancashire and other areas excluded by the more precise definitions of the other regions. Allowing for differences in the response rate from companies in these regions, and including further allowance, on a capital per employee basis, for organisations holding assets in more than one region, it is estimated that roughly 75 per cent of the industry's assets are in Yorkshire, 20 per cent in Scotland, Ireland and the North-East, and the remaining 5 per cent in Wales and the West. It must be emphasised, however, that there is no reliable means of checking this conjecture other than against the manpower analysis in Article 2.1, with which a fairly close agreement has been achieved.

### 5.2 Sources of the existing capital

Corresponding to the assets discussed in the previous article, the industry has liabilities as shown in Table 5.2. The industry as a whole finances half its total assets by equity capital, and nearly 16 per cent by bank loan and overdrafts. The level of trade debts owed by the industry is about 10 per cent below that of debtors, and this net disadvantage bas been suffered consistently over the last five years. This possibly indicates an untapped source of finance. There has been little movement in the proportions of the various forms of finance since 1963, except for an increase in bank borrowing between the first two years of the period covered by the questionnaire, an increase which appears to correspond to an increased value of stock in the same period. Preference share capital has never been a large source of finance, and has naturally tended to diminish even further since the introduction of Corporation Tax.

In Table 5.2 are also illustrated the basic liability structures of the main divisions of the industry, in which a considerable variation in pattern can be seen in the proportion of total finance provided by equity capital. There is little variation, however, in the proportion supplied by non-bank fixed interest debt, the major alternative source of finance for those companies with low equity ratios being tbe banks and creditors. This gives substance to the view often expressed within the industry that capital has not been scarce because the industry has good access to the banks and tends to regard bank borrowing as a source not only of working capital but also of capital for fixed asset acquisition, although several companies dislike bank loans because of their feeling of losing completely-independent control of their activities. The banks are particularly open to criticism for their apparent open-bandedness to many organisations in this industry.

The ratio of fixed interest capital to total capital employed (including bank borrowing) in each division is shown below:

| *Division* | *Gearing (per cent)* |
|---|---|
| Combers and recombers | 56 |
| Worsted spinners | 31 |
| Woollen yarn producers | 42 |
| Worsted weavers | 36 |
| Woollen weavers | 11 |
| Integrated worsted organisations | 40 |
| Integrated woollen organisations | 25 |
| Woollen and worsted organisations | 40 |
| Dyers and finishers | 39 |
| Rag and waste processors | 17 |
| Scourers and carbonisers | 56 |
| Merchants and topmakers | 68 |
| WHOLE INDUSTRY | 38 |

Table 5.2 – The industry's sources of capital

| | *Liabilities in 1967 (£ million)* | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | *Current liabilities* | | |
| *Division* | *Equity* | *Preference shares* | *Long-term borrowing* | *Short-term borrowing* | *Bank loans* | *Others* | *TOTAL* |
| Combers and recombers | 16·0 | 1·4 | 4·4 | 0·6 | 13·7 | 11·5 | 47·6 |
| Worsted spinners | 55·3 | 2·7 | 10·6 | 7·7 | 3·4 | 14·6 | 94·3 |
| Woollen yarn producers | 11·3 | 0·6 | 3·9 | 0·2 | 3·4 | 5·1 | 24·5 |
| Worsted weavers | 7·5 | 0·4 | 0·8 | 0·2 | 2·8 | 1·8 | 13·5 |
| Woollen weavers | 4·9 | 0·0 | 0·4 | 0·0 | 0·2 | 1·5 | 7·0 |
| Integrated worsted organisations | 9·9 | 1·7 | 0·8 | 0·4 | 3·8 | 5·9 | 22·5 |
| Integrated woollen organisations | 35·4 | 3·5 | 3·2 | 0·3 | 5·0 | 7·1 | 54·5 |
| Worsted and woollen organisations | 44·1 | 6·7 | 5·0 | 0·1 | 17·1 | 10·7 | 83·7 |
| Dyers and finishers | 14·2 | 0·6 | 3·7 | 3·0 | 2·2 | 3·8 | 27·5 |
| Rag and waste processors | 4·2 | 0·4 | 0·1 | 0·0 | 0·3 | 0·8 | 5·8 |
| Scourers and carbonisers | 1·9 | 0·4 | 0·2 | 0·0 | 1·8 | 0·9 | 5·2 |
| Merchants and topmakers | 14·6 | 3·0 | 2·9 | 1·3 | 16·9 | 16·9 | 55·6 |
| WHOLE INDUSTRY | 219·3 | 21·4 | 36·0 | 13·8 | 70·6 | 80·6 | 441·7 |

Divisions where the gearing ratio is particularly high—combers and recombers, scourers and carbonisers, merchants and topmakers—all have bank loans around 40 per cent of capital, although in the case of scourers and carbonisers this is a larger proportion of total liabilities than their stocks: assets ratio whereas the other two divisions have high stock ratios to match their high gearing. Non-bank debt is particularly important for worsted spinners and dyers and finishers. There is little overall correlation between the ratios of bank borrowing to total liabilities and of stocks to total assets among the various divisions. Three divisions (integrated worsted organisations, combers and recombers, and merchants and topmakers) were net debtors throughout the 5-year period, a factor which it seems appropriate to link to their profitability figures—discussed in Article 5.4—which were the industry's lowest. There is also interplay between corporate activity and size, as was shown in Chapter 4, and analyses of the questionnaire returns into six size bands revealed certain discrepancies of financing patterns, as shown in Table 5.3.

Table 5.3 – Capital and company size

| *Company size (£m capital employed)* | *Sources of capital (per cent)* Equity | Bank loans | Other | TOTAL |
|---|---|---|---|---|
| Up to £0·1 m | 33 | 9 | 58 | 100 |
| £0·1 m–£0·25 m | 50 | 9 | 41 | 100 |
| £0·25 m–£0·5 m | 57 | 15 | 28 | 100 |
| £0·5 m–£1·0 m | 56 | 14 | 30 | 100 |
| £1·0 m–£5·0 m | 49 | 15 | 36 | 100 |
| £5·0 m and over | 49 | 21 | 30 | 100 |
| WHOLE INDUSTRY | 50 | 16 | 34 | 100 |

The high proportions of non-bank debt of the two smallest size bands possibly reflect their lack of access to normal supplies of equity capital, proprietors and other loans having to supply a large part. Elsewhere in the industry, non-bank debt tends to be at a more uniformly low level, and accessibility of bank loans and of equity capital correspondingly higher. On the other hand, as Table 5.4 shows, there is little apparent divergence in methods of financing between the different types of company ownership. In both these tables it is therefore probably more relevant to relate financial structure to earnings records and prospects rather than merely to size and structure. Furthermore, it must be realised that these analyses from questionnaire returns conceal variations between individual organisations comprising each sub-division. While each category in Table 5.4 is an average of a large number of companies, certain size bands in Table 5.3 are less representative, and must, therefore, be qualified as much as the divisions of merchants and topmakers, mungo and shoddy makers,

Table 5.4 – Capital and company status

| | *Sources of capital (per cent)* | | | |
|---|---|---|---|---|
| *Company status* | *Equity* | *Bank loans* | *Other* | *TOTAL* |
| Public | 48 | 19 | 33 | 100 |
| Private | 51 | 13 | 36 | 100 |
| Close | 53 | 18 | 29 | 100 |
| WHOLE INDUSTRY | 50 | 16 | 34 | 100 |

and scourers and carbonisers, from all of which particularly low response levels were obtained. While these reservations are noted at this stage, they become more important in subsequent articles.

### 5.3 The industry's income

In Table 5.5 are listed the estimated sales revenues at constant prices for each of the divisions of the industry from 1963 to 1967. The value of work done on commission is included. As in the case of the balance sheet items discussed in the previous two articles, the revenue figures have been scaled up, on the basis of 1967 employment ratios, from questionnaire returns; poor responses from the divisions of scourers and carbonisers and rag and waste processors make their figures, fortunately small, somewhat unreliable. The figures for the merchants and topmakers were obtained by subtracting the sum of the remaining divisions from the industry total obtained on the basis of aggregate employment ratios. Nevertheless, it is considered that the turnover of the merchants and topmakers division as shown in the table is a realistic figure.

**Table 5.5 – Revenues during recent years**

| | *Revenue (£ million)* | | | | |
|---|---|---|---|---|---|
| *Division* | *1963* | *1964* | *1965* | *1966* | *1967* |
| Combers and recombers | 94 | 120 | 107 | 113 | 98 |
| Worsted spinners | 142 | 147 | 142 | 133 | 119 |
| Woollen yarn producers | 30 | 39 | 40 | 36 | 31 |
| Worsted weavers | 20 | 21 | 21 | 20 | 20 |
| Woollen weavers | 9 | 10 | 10 | 10 | 10 |
| Integrated worsted organisations | 36 | 39 | 41 | 40 | 37 |
| Integrated worsted organisations | 69 | 74 | 75 | 78 | 74 |
| Woollen and worsted organisations | 118 | 120 | 113 | 109 | 102 |
| Dyers and finishers | 25 | 33 | 36 | 37 | 37 |
| Rag and waste processors | 3 | 3 | 3 | 3 | 3 |
| Scourers and carbonisers | 15 | 17 | 14 | 19 | 15 |
| Merchants and topmakers | 200 | 209 | 181 | 178 | 148 |
| WHOLE INDUSTRY | 407 | 396 | 385 | 384 | 350 |

The aggregate industry turnover figures at the bottom of the table are clearly not the sum of divisions' figures, which would represent the total level of economic activity in the industry. They were, however, derived from that sum and as such were subject to a number of explanations and qualifications:

(a) The sum of the component divisions contains considerable double and treble-counting of, for example, raw material costs, although possibly less in 1967 than in 1963 as a result of company integration;

(b) As in the case of the balance sheet tables, it does not account for the turnover in earlier years of companies now extinct;

(c) A basic decline in the weight of materials processed is the main element of decline in turnover;

(d) A trend towards lower-cost materials exacerbates this decline;

(e) Fluctuations in material prices cause fluctuations about the trend line of turnover.

To correct these a number of modifications have been made to produce the figures in the bottom row of Table 5.5. These are reproduced as the top curve in Figure 5.1, and represent the estimated sales turnover of the industry. Firstly, the cost of raw materials bought into the industry for processing during 1967 was estimated, using average prices for each main class of fibre and allowing for a time lag between purchase and processing. The total value of sales of the industry was estimated from the market research work, consisting of £230 m home sales and £120 m exports, and the ratio between this total of £350 m and that of the material cost of £171 m was derived. The cost of raw materials in previous years was then determined at constant 1967 prices but allowing for different levels of consumption of various fibre types, and the 1967 material cost: sales ratio applied to derive an estimated sales turnover figure for the five-year period in real terms. The turnover curve in Figure 5.1 is, therefore, a financial measure of the industry's physical output in real terms, and shows a decline of about 2·8 per cent annually. It is interesting to note that, by using a constant sales: material cost ratio, correction is probably made for the sales of companies which have gone out of business, whose turnover could not be included in Table 5.5. With a slightly lower decline rate than that of the asset value of the industry, these estimates imply a slightly improving capital turnover in the industry as a whole over this period.

It is difficult to apply this approach to individual divisions of the industry because of the numerous overlaps in activities between divisions. In terms of material cost there has been little real change in the woollen sectors over the period 1963-1967 when measured at 1967 prices; the worsted sectors have, however, had a decline in material processed at constant prices, an index of cost of 100 in 1963 having fallen to 74 by 1967. The implication of this is that much of the sharp rise in apparent turnover in the combing sector, as in the industry as a whole, between 1963 and 1964 is largely due to the rise in price of raw materials, the average cost of Merino and crossbred wools during the year having risen by over 10 per cent. Similarly the decline in apparent turnover since 1964 is more severe than actually occurred in real terms, in view of falling prices of both natural and man-made fibres.

The estimated proportions of revenue accounted for by work done on commission in the divisions over the last five years are tabulated in Table 5.6.

**Table 5.6 – Commission working in the industry**

| | *Commission work (per cent of total revenue)* | | | | |
|---|---|---|---|---|---|
| *Division* | *1963* | *1964* | *1965* | *1966* | *1967* |
| Combers and recombers | 10 | 10 | 11 | 7 | 7 |
| Worsted spinners | 2 | 3 | 3 | 3 | 5 |
| Woollen yarn producers | 2 | 2 | 1 | 1 | 2 |
| Worsted weavers | 5 | 6 | 6 | 6 | 6 |
| Woollen weavers | 2 | 2 | 2 | 2 | 3 |
| Integrated worsted organisations | 1 | 2 | 2 | 3 | 1 |
| Integrated woollen organisations | 1 | 1 | 1 | 1 | 1 |
| Woollen and worsted organisations | 4 | 4 | 4 | 4 | 4 |
| Dyers and finishers | 70 | 57 | 57 | 58 | 53 |
| Rag and waste processors | 12 | 9 | 10 | 7 | 12 |
| Scourers and carbonisers | 65 | 63 | 69 | 62 | 61 |
| Merchants and topmakers | 1 | 1 | 2 | 2 | 1 |
| WHOLE INDUSTRY | 8 | 8 | 9 | 9 | 10 |

It can be seen that the overall level of commission working in the industry has risen as a proportion of the total industrial activity, although having remained at around the £70 m level since 1964. The increased proportion is accounted for almost entirely by the growth in the turnover of the dyeing and finishing division which increased its activity by nearly 50 per cent in the five year period; a large measure of this growth is believed to comprise work done on products of the Lancashire or Leicestershire industries. The decline in commission combing was discussed in Article 3.6.

One further element of turnover which can be indicated is the stock turnover of the industry (which is the ratio of total sales to average stocks) and indicates the liquidity of the industry's or division's investment in stocks. The ratio, in terms of gross sales to stocks, has declined from 4:2 in 1964 to 3:4 in 1967, and ratios of this magnitude are found in most woollen and worsted divisions, woollen yarn producing organisations being significantly higher than the average with a 1964 ratio of 6:3 falling to 5:1 in 1967. The two divisions working predominantly on commission, dyers and finishers, and scourers and carbonisers, naturally have much more liquid stocks than the average. The only divisions to have improved the liquidity of their stocks were woollen weaving and integrated woollen organisations. Since in general the liquidity ratio of the industry and its component divisions (which is the ratio of current assets to current liabilities) has also been falling, it is clear that the industry is becoming increasingly unable to generate or retain immediately disposable funds that could ensure its flexibility in response to competition or technological progress.

## 5.4 Profitability

Beneath the top line in Figure 5.1 is marked a band showing the gross profits of the industry on its turnover in recent years. The figure shows a decline over the period, which is revealed in more detail in Figure 5.2. The figures in this table are again derived from the questionnaire, and are, therefore, subject to the customary qualifications, but clearly illustrate the failing health even of those organisations still in the industry, without recognising the loss of companies (and of over 20,000 employees) over the period. (An allowance for these is taken into account in Figure 5.1.) The figures in the table have again been converted into real terms to show the true trend of the industry's profits and of the various areas into which these profits have been appropriated. There has been a steady but slight increase of about 1·9 per cent in the provision for depreciation, and a falling allocation to directors' and partners' emoluments, which are included here in accordance with accounting convention, but a substantial proportion of which are normal salary payments to working directors. In money terms, these emoluments have risen slightly over the period, but there has been a 10 per cent drop in total real purchasing power of money paid to directors and the like, although it is unlikely that there has been a drop in the number of managers to whom these payments were made.

Interest payments, which were very low in 1963, have risen sharply, but comparison with the figure in Table 5.2 shows that even in 1967 interest paid was only 3¼ per cent of total fixed interest loans. There has, however, been some inconsistency in the information obtained on interest paid and payable, stemming from two difficulties:

(a) Companies within the industry which are subsidiaries of organisations outside the industry do not necessarily pay interest as such on loans from their parent company; in these cases their net profits figures will be somewhat inflated by containing a quasi-interest charge;

(b) Several companies operating with large bank overdrafts cannot apparently identify separately the bank interest due, which has been aggregated into bank liabilities.

Since total interest charges paid by the industry in 1967 were 3½ per cent of all fixed interest debt and 8 per cent of all non-bank loans, these must represent the limits of the

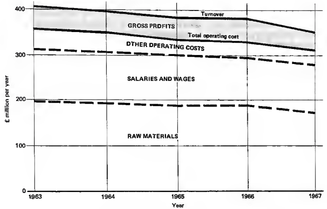


FIGURE 5.1 – TURNOVER AND PROFITABILITY IN RECENT YEARS

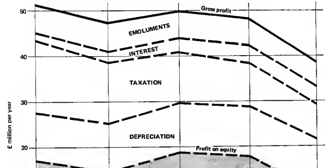


FIGURE 5.2 – PROFIT APPROPRIATIONS

average cost of debt capital in the industry, the true average figure probably being around 6 to 7 per cent since the number of companies, and their aggregate bank liabilities, thought to be affected by consideration (b) is fairly large. Interest paid, therefore, represents a ludicrously small proportion of debt capital since much of the industry operates on permanent bank overdrafts, the cost of which is generally very little above Bank Rate.

Tax payable has declined over the period from 37 per cent of taxable profits in 1963 to 24 per cent in 1966, rising again to 27 per cent in 1967. In aggregate the industry appears to have maintained distribution levels at the expense of reserves, net contributions to which fell alarmingly.

In the figures below it can be seen that the gross trading profits of the industry shown in Figure 5.2 have also fallen in proportion to the net assets of the industry, being the total assets less liabilities to non-bank creditors. This ratio has been chosen as a useful comparative indicator for the individual divisions, since it avoids differences of profit appropriations and treats bank borrowing as a semi-permanent source of capital; but the reservations about interest payment are obviously a slight drawback. The more orthodox ratio of net profit to capital employed is also shown, revealing a somewhat different pattern of decline and hence echoing the slight changes in methods of financing referred to in Article 5.2. The third ratio is included to compare the net return to equity holders with ordinary shareholders' current expectations of around 11-12 per cent, and should be considered, together with the declining asset values and payments into reserves in the industry, as a poor prospect for equity shareholders.

| | *Profitability ratios (per cent)* | | | | |
|---|---|---|---|---|---|
| | *1963* | *1964* | *1965* | *1966* | *1967* |
| Gross trading profit/net assets | 14·4 | 12·5 | 13·3 | 13·1 | 10·7 |
| Net profit/capital employed | 5·7 | 4·8 | 6·2 | 5·9 | 3·3 |
| Net profit/equity | 7·5 | 6·4 | 8·2 | 7·9 | 4·5 |

The gross profits of the individual divisions of the industry over the period 1963 to 1967, adjusted to 1967 prices, are shown in Table 5.7, those of the merchants and topmakers having been inferred by deduction while the remainder were as usual scaled up from

Table 5.7 – The industry's profits

| | *Gross trading profit (£ million)* | | | | |
|---|---|---|---|---|---|
| *Division* | *1963* | *1964* | *1965* | *1966* | *1967* |
| Combers and recombers | 2·5 | 1·7 | 2·7 | 2·7 | 1·9 |
| Worsted spinners | 15·3 | 11·9 | 12·5 | 11·6 | 7·6 |
| Woollen yarn producers | 2·8 | 3·3 | 3·2 | 2·8 | 2·5 |
| Worsted weavers | 1·6 | 1·4 | 1·6 | 1·4 | 1·3 |
| Woollen weavers | 0·9 | 1·1 | 1·1 | 1·1 | 1·1 |
| Integrated worsted organisations | 2·2 | 2·3 | 2·4 | 2·0 | 1·9 |
| Integrated woollen organisations | 6·4 | 6·5 | 7·4 | 7·6 | 7·1 |
| Woollen and worsted organisations | 10·3 | 10·0 | 9·8 | 10·0 | 7·9 |
| Dyers and finishers | 4·9 | 5·4 | 5·5 | 5·3 | 4·6 |
| Rag and waste processors | 0·6 | 1·1 | 1·0 | 0·8 | 0·7 |
| Scourers and carbonisers | 0·7 | 0·7 | 0·8 | 0·8 | 0·7 |
| Merchants and topmakers | 3·4 | 1·8 | 2·0 | 2·2 | 1·4 |
| WHOLE INDUSTRY | 51·6 | 47·2 | 50·0 | 48·3 | 38·7 |

questionnaire returns on an employment basis. It can be seen that few divisions have shown steady movements in their trading returns; the general trend of woollen weavers, integrated woollen organisations and of dyers and finishers has been upward, but those of most other divisions have shown a decline. Seen as a proportion of net assets, however, as listed in Table 5.8, almost every division presents a picture of both low and declining profitability, although the improved trading conditions since 1967 are tending to show that as an abnormally bad year. Nevertheless, many of the sectors also clearly fared badly in 1966, and declining trends are still evident even if the 1967 figures are ignored.

Table 5.8 – Profitability in recent years

| | *Gross profits (per cent of book assets)* | | | | |
|---|---|---|---|---|---|
| *Divisions* | *1963* | *1964* | *1965* | *1966* | *1967* |
| Combers and recombers | 7 | 4 | 7 | 7 | 5 |
| Worsted spinners | 18 | 14 | 16 | 15 | 10 |
| Woollen yarn producers | 21 | 23 | 20 | 17 | 13 |
| Worsted weavers | 14 | 12 | 13 | 12 | 11 |
| Woollen weavers | 18 | 22 | 22 | 20 | 20 |
| Integrated worsted organisations | 13 | 13 | 14 | 12 | 11 |
| Integrated woollen organisations | 14 | 14 | 15 | 16 | 15 |
| Woollen and worsted organisations | 14 | 12 | 13 | 13 | 11 |
| Dyers and finishers | 27 | 26 | 23 | 22 | 19 |
| Rag and waste processors | 12 | 18 | 19 | 15 | 14 |
| Scourers and carbonisers | 19 | 17 | 14 | 21 | 16 |
| Merchants and topmakers | 8 | 4 | 5 | 5 | 4 |
| WHOLE INDUSTRY | 14 | 13 | 13 | 13 | 11 |

Variations between divisions in the pattern of profit appropriations are shown in Table 5.9, the results of 1966 and 1967 having been averaged in an endeavour to avoid extreme results.

Table 5.9 – Profit appropriations in 1967

| | *Appropriations (per cent of gross profits)* | | | | | |
|---|---|---|---|---|---|---|
| *Division* | *Emoluments* | *Interest* | *Taxation* | *Depreciation* | *Dividends* | *Retentions* |
| Combers and recombers | 11 | 25 | 8 | 35 | 21 | –21 |
| Worsted spinners | 11 | 4 | 17 | 37 | 31 | – 2 |
| Woollen yarn producers | 19 | 11 | 15 | 36 | 14 | 5 |
| Worsted weavers | 23 | 5 | 23 | 18 | 28 | 3 |
| Woollen weavers | 18 | 4 | 24 | 15 | 19 | 20 |
| Integrated worsted organisations | 11 | 15 | 17 | 31 | 26 | – 4 |
| Integrated woollen organisations | 2 | 19 | 23 | 19 | 25 | 12 |
| Woollen and worsted organisations | 7 | 12 | 21 | 25 | 35 | – 3 |
| Dyers and finishers | 15 | 1 | 20 | 27 | 13 | 24 |
| Rag and waste processors | 31 | – | 20 | 23 | 17 | 9 |
| Scourers and carbonisers | 39 | – | 18 | 16 | 9 | 18 |
| Merchants and topmakers | 41 | 23 | 13 | 12 | 11 | –23 |
| WHOLE INDUSTRY | 13 | 9 | 19 | 27 | 29 | 3 |

In the five cases where a division has made a net withdrawal from reserves, the other elements of the gross profits are shown as a proportion of their total (positive) magnitudes, the loss on reserves being shown as an additional negative proportion of the total and emphasised. That a division has a net negative movement on reserves does not, of course, imply payment of dividends out of reserves by any or all organisations, but that some organisations in a division had sufficiently large losses to outweigh the profits of the others. The table shows that the low aggregate proportion of profits retained is to a large extent caused by five loss-making divisions, three of which are very big, while three small divisions had net retentions of 18 per cent of total gross profits or more. Distributions were generally a fair proportion of gross profits, the industrial average of 29 per cent being largely determined by the large divisions of worsted spinners and woollen and worsted organisations. The variation in interest paid shows that interest on bank loans was properly included in this category by some questionnaire respondents, since the two divisions with the highest proportions of interest payments are those with the highest proportions of bank loans in their liabilities. The variations in directors' and partners' emoluments tend to reflect average company sizes within divisions and the consequent different management organisations, confirming the view that the majority of such emoluments in the industry are paid to working directors as normal compensations

In assessing the industry's profitability from the questionnaire returns, three further analyses were made besides those relating to the whole industry and to the activity divisions; these were

(a) by location of the companies;

(b) by size of company;

(c) by type of ownership of the companies.

The results of these are shown in turn below, the returns in each case being shown as gross profits as a proportion of net assets, to take account of differing levels of bank borrowing.

The comparison of profitability by geographical region of the organisations' main activities is given in Table 5.10.

Table 5.10 – Profitability and company location

| | *Gross profits (per cent of book assets)* | | | | |
|---|---|---|---|---|---|
| Region | *1963* | *1964* | *1965* | *1966* | *1967* |
| Yorkshire | 14 | 12 | 13 | 13 | 11 |
| Scotland, Ireland, N. England | 18 | 18 | 20 | 14 | 9 |
| Wales and West England | 11 | 12 | 12 | 12 | 11 |
| WHOLE INDUSTRY | 14 | 13 | 13 | 13 | 11 |

The reasons for the Scottish region's former higher profitability are probably that Scottish mills could command higher prices than average for their high-quality woollens. The introduction of Development Area status in 1967 clearly cannot explain their earlier higher profitability, nor the drop in 1966 and 1967. In the case of Wales and the West of England, higher labour and transport costs may account for their lower profitability up to 1966.

The figures below compare the profitability of the six different sizes of organisation into which the returns were sorted. It should be borne in mind that the group with capital employed exceeding £5 million consists of very few organisations, and hence individual results tend to rule out any valid generalisation on this group.

| Size of organisation (£ m capital employed) | Average gross profits (1963-1967) per cent of net assets |
|---|---|
| Up to £0·1 m | 13·7 |
| £0·1 m –£0·25 m | 13·4 |
| £0·25 m–£0·5 m | 12·7 |
| £0·5 m –£1·0 m | 11·5 |
| £1·0 m –£5·0 m | 12·7 |
| £5·0 m and over | 11·8 |
| WHOLE INDUSTRY | 12·8 |

The figures suggest that profitability and organisation size are to some extent inversely correlated. A comparison of the same subdivisions on a basis of net profits as a proportion of capital employed, however, produces the contrary result, both because appropriations from gross profits form a large proportion of smaller organisations' results and, as shown in Table 5.3, because bank financing, which is excluded from capital employed, forms a larger part of the larger organisations' liabilities.

The figures below compare the profitability of companies with different types of ownership. It should be observed that the three groups are not each mutually exclusive, close companies including both public and private organisations.

| Organisation status | Average gross profits (1963-1967) per cent of net assets |
|---|---|
| Public | 12·9 |
| Private | 12·8 |
| Close (private and public) | 11·5 |
| WHOLE INDUSTRY | 12·8 |

In this case profitability as shown in the table follows the same pattern as that of net profits over capital employed, since as shown in Table 5.4, there is comparatively little difference in the methods of financing the three types of organisation. Because of their apparent lower gross profitability as well as their size, close companies tend to pay a larger proportion of their gross profits to directors and partners than other types of organisation, and to have a smaller, and also declining, tax burden.

### 5.5 Cash flows and capital investment

The figures in Table 5.11 show the net capital investment in fixed assets made in the industry during recent years, tabulated at constant 1967 prices. The figures were derived from changes in the divisions' and the industry's balance sheets, which in turn were based on questionnaire returns to which the customary employment ratios had been applied. The pattern of investment obtained by this means roughly corresponds to the answers to questions specifically concerned with companies' actual purchases and sales of fixed assets, but present a more representative picture for the whole industry. The rate of capital expenditure over the years by individual divisions can be seen to correspond fairly closely with the levels of fixed assets, while there has been little change in the asset value of smaller divisions. The disinvestment by merchants and topmakers has been derived by reduction of the other divisions from the aggregated industry total, but, despite the roughness of this method, the resulting figures appear to correspond well with trends in this division. As in the earlier articles, this analysis fails to account for the disinvestment of companies leaving the industry. If the real trend of asset value discussed in Article 5.1 is at all accurate, the net investment of the industry was around £10 million annually between 1963 and 1965, falling to around half that figure in the later years.

Table 5.11 – Capital investment in recent years

| Division | *Net investment in fixed assets (£ million)* | | | |
|---|---|---|---|---|
| | *1963-64* | *1964-65* | *1965-66* | *1966-67* |
| Combers and recombers | 1·5 | 1·7 | –0·3 | 0·1 |
| Worsted spinners | 5·3 | 5·2 | 5·1 | 3·3 |
| Woollen yarn producers | 1·2 | 3·3 | 1·6 | 1·3 |
| Worsted weavers | 0·5 | 0·3 | 0·4 | 0·4 |
| Woollen weavers | 0·1 | 0·2 | 0·4 | 0·4 |
| Integrated worsted organisations | 1·3 | 1·0 | 0·8 | 0·6 |
| Integrated woollen organisations | 1·6 | 2·2 | 2·8 | 3·5 |
| Woollen and worsted organisations | 3·8 | 2·5 | 2·2 | 2·5 |
| Dyers and finishers | 1·5 | 3·1 | 1·4 | 1·2 |
| Rag and waste processors | 0·4 | 0·2 | 0·3 | 0·1 |
| Scourers and carbonisers | 0·3 | 0·2 | 0·2 | 0·5 |
| Merchants and topmakers | 0·8 | –0·8 | –2·0 | –0·7 |
| WHOLE INDUSTRY | 18·3 | 19·1 | 12·9 | 13·2 |

The totals in Table 5.11 are incorporated into Table 5.12, which shows the cash movements of the industry, and the financing of fixed capital and other investment for the same years, again obtained from the inter-year movements in balance sheet items and year-end profit and loss movements. It must be pointed out that the figures for this table are distorted by capital movements between one organisation in the industry and its parent organisation; without that group's results included, the aggregate cash deficit in 1966 would be slightly smaller and the surplus in 1967 would be considerably lower (at £1·8 million). Corresponding to these changes would be a net increase in loan capital in 1967, the net cash balance in 1967 being slightly positive.

The industry can be seen to have been short of internally-generated cash throughout these years, financing the deficit largely by new equity capital. The variation of individual divisions is quite marked. The combing organisations produced large trading cash deficits in 1964 and 1965, balanced by increased debenture capital, and large surpluses in 1966 and 1967, when their long-term debt was reduced and considerable inroads were made on issued equity as well as on reserves. The large woollen and worsted organisations, after a deficit of over £6 million in 1964, met by both loan and equity capital, produced small cash surpluses for the last three years. Throughout the woollen sectors, and, until 1967, in the commission dyeing and finishing sector, there have been regular large cash deficits.

The choice of equity capital as the major means of financing the cash deficits can be interpreted both as a recognition that the industry is already fairly (although not alarmingly) highly-geared, and as an indication that the low profitability of the industry in recent years has made it unattractive for lenders of fixed interest capital. Furthermore, the cash deficits shown in Table 5.12 would have been greater still had not bank loans been fairly readily available throughout these years, although it is possible that the industry has been able to let its level of debtors rise £10 million above that of its creditors only because of the availability of bank lending. To this extent, therefore, the industry is particularly vulnerable to high interest rates or bank credit restrictions. Its ability to raise new equity capital does not seem to have been impaired by its poor earnings record, and current high share prices are a possible indication that many of the public companies in the industry would still be able to raise new funds. The industry as a whole, however, is hampered in its capital-raising power both by the desire of small numbers of private shareholders, even in the largest of companies, to retain control, and also by the penal tax rates levied on earnings retentions by

Table 5.12 – Financing recent investments

| | *(£ million)* | | | |
|---|---|---|---|---|
| | *1964* | *1965* | *1966* | *1967* |
| *Capital investment:* | | | | |
| New fixed assets | 18·3 | 19·1 | 12·9 | 13·2 |
| Extra working capital and cash | – | 8·4 | 3·4 | – |
| Purchase of investments | 11·7 | – | 0·3 | – |
| TOTAL | 30·0 | 27·5 | 16·6 | 13·2 |
| *Source of funds:* | | | | |
| Retained profits | 3·7 | 7·0 | 2·2 | 0·2 |
| Depreciation funds available | 10·7 | 11·1 | 11·3 | 11·6 |
| Decreased working capital and cash | 13·2 | – | – | 0·7 |
| Sale of investments | – | 2·7 | – | 1·6 |
| TOTAL internal funds | 27·6 | 20·8 | 13·5 | 14·1 |
| New fixed-interest loans | –1·8 | – | 4·0 | –1·6 |
| New equity capital | 4·2 | 6·7 | –0·9 | 0·7 |
| TOTAL | 30·0 | 27·5 | 16·6 | 13·2 |

close companies, which are estimated to hold around a quarter of the asset value of the industry.

Whereas the industry at present appears to have certain handicaps to obtaining new capital, despite the raising of over £12 million on balance between 1963 and 1967, it should be noted that UK industry is among the most favourably placed in the world for making new investments. The rate of Corporation Tax and the available investment allowances and cash grants, even outside Development Areas, make the required return on new projects over 7 per cent lower than that on equivalent projects anywhere else in Europe, a smaller advantage also persisting in comparison with Japan or the USA. These margins of advantage are considerably widened by Development Area benefits, but are themselves evidence that the industry is not suffering under a fiscal disadvantage compared with its competitors, although, as Chapter 7 will show, its capital benefit is far outweighed by its lack of competitiveness in other cost areas.

# Part Two The industry's markets

# Chapter 6 Forecasts of United Kingdom consumption

## 6.1 Present trends in the pattern of consumption

In Chapter 3, the present markets of the industry were discussed in terms of the primary products (tops, worsted yarn, woollen woven fabric, etc.) and in terms of the ultimate consumer products (menswear, blankets, carpets, etc.). Table 3.1 divided supplies of these products into three groups, production within the wool textile industry, production by other UK suppliers, and imports. This present chapter is primarily concerned with forecasting total UK consumption, irrespective of source of supply, so that as a first step it is useful to re-analyse the statistics given in Chapter 3 in terms of UK consumption alone.

Figure 6.1 shows how home consumption of the industry's main products has changed over the past eight years. For the fabrics, consumption has been calculated from delivery figures, modified by export and import quantities. Consumption of yarns has been derived by the same method for that proportion of products sold outside the industry; to these figures has

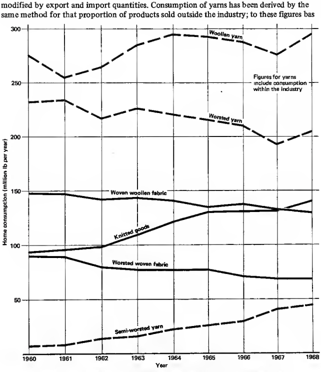


FIGURE 6.1 – RECENT HISTORY OF UNITED KINGDOM CONSUMPTION

been added the yarn equivalent (making allowances for process losses) of fabrics consumed at home. The figures for yarns cannot therefore easily be compared with production or delivery statistics as published by WIBS, as at each stage in the process sequence export quantities have been subtracted and imports added.

The significant feature of Figure 6.1 concerning fabrics is the slow decline in consumption of both worsted and woollen cloth, which is more than compensated by the growth in consumption of knitted fabric. Home consumption of semi-worsted yarns has more than doubled in the past five years, and woollen yarn consumption has also shown some increase, both trends being due to the growth in carpet production. Worsted yarn consumption has decreased in line with worsted cloth, since much of the growth in knitted fabrics has been supplied by continuous filament yarns. It is also worthy of note that those products showing rapidly-increasing consumption (knitted fabrics and semi-worsted yarns) are also the products containing the highest proportion of man-made fibres.

### 6.2 Development of consumer expenditure

The future pattern of demand for wool textile products will depend to a large extent on the growth of consumer spending and on changes in the pattern of consumer purchases. These factors form the framework within which more detailed forecasts can be made.

Between 1956 and 1966, total consumer expenditure rose by 34·5 per cent at constant prices, or about 3 per cent per year. Gross national product grew at a slightly lower rate. As there has been no acceleration in this growth in the last few years, and assuming that there will continue to be a balance of payments constraint on growth for several years, a similar rate may be expected between now and 1975. It will therefore be assumed that both GNP and consumers' expenditure will grow at 3 per cent per year, that is, by 27 per cent over the whole period from 1967 to 1975. The most recent government estimates suggest only 2·4 per cent per year growth in consumer expenditure up to 1972, with up to 3·2 per cent thereafter.

Of more immediate relevance to the growth in demand for textile products is the proportion of consumers' expenditure devoted to clothing and other fabric uses. In developed countries, there is a tendency for the proportion of expenditure spent on foods, beverages and tobacco, and clothing and footwear to decline, while the proportion devoted to consumer durables, recreation, overseas travel and services of all sorts increases. This has been true for the United Kingdom and most other West European countries in the recent past. Evidence from countries having a higher standard of living than the United Kingdom, notably the United States and Sweden, indicates that these trends are likely to continue. It is interesting to note that in the United States, where the consumer-durable boom has come to an end, the proportion of expenditure on clothing has continued to decline in favour of recreation and other services.

There is reason to suppose, however, that the pattern of spending in the future will not be quite the same as that in the recent past. The main reason for this is the expected change in

Table 6.1 – Growth of United Kingdom population

| *Age group* | *Population (m)* | | | *Percentage increase* | |
|---|---|---|---|---|---|
| | *1957* | *1967* | *1975* | *1957-67 (10 years)* | *1967-75 (8 years)* |
| Infants (0-4) | 3·9 | 4·8 | 5·2 | 23 | 8 |
| Children (5-14) | 8·0 | 8·2 | 9·5 | 2 | 16 |
| Women (15-29) | 4·9 | 5·7 | 6·0 | 16 | 5 |
| Women (Over 29) | 16·0 | 16·2 | 16·5 | 1 | 2 |
| Men (15-29) | 5·0 | 5·9 | 6·2 | 18 | 5 |
| Men (Over 29) | 13·9 | 14·3 | 14·6 | 3 | 2 |
| TOTAL | 51·7 | 55·1 | 58·0 | 6·5 | 5·5 |

the age distribution of the population. Table 6.1 gives population figures for 1957 and 1967 together with forecast figures for 1975, taken from the Annual Abstract of Statistics.

The most notable feature of the earlier period was the relatively high growth of the population in the age range 15 to 29 for both men and women. This age group accounts for a disproportionate part of expenditure on clothing, and thus the population trends since 1957 have been favourable to the clothing and textile industries. In the future, however, this growth will not be maintained, so that a rather slower growth in expenditure on clothing can be anticipated. It will be assumed that expenditure on clothing will rise 0·8 times as fast as total consumer expenditure, rather than 0·85 times as in the previous decade. This implies a growth of 22 per cent during the period 1967 to 1975, or an increase in expenditure on clothing from £1,746 m in 1967 to £2,122 m in 1975, at constant 1967 prices.

Having established the likely growth in total expenditure on clothing, it is now necessary to consider differences in the growth of spending on various categories within clothing. Marked differences have existed in the past, as is shown by the following figures, which give growth in expenditure on various categories of clothing at constant prices between 1957 and 1966:

| | |
|---|---|
| Men's outerwear | +30% |
| Men's underclothing and hose | + 3% |
| Women's outerwear | +70% |
| Women's underclothing and hose | +16% |
| Children's wear | −1% |
| Infants' wear | +56% |
| All clothing | +27% |

The figures have been derived from the Family Expenditure Survey. It can be seen that in general women's wear has grown very much faster than menswear and that outerwear has grown very much faster than underwear.

In the light of these figures, it is possible to estimate expenditure on these categories of clothing in 1975. Table 6.2 gives a breakdown of expenditure on clothing in 1967, the figure for total expenditure on clothing being taken from the National Income and Expenditure Survey; the table also gives forecasts for 1975.

Table 6.2 – Forecast of expenditure on clothing

| *Product* | *Expenditure (£ m)* | | *Percentage increase 1967-1975* |
|---|---|---|---|
| | *1967* | *1975* | |
| Men's outerwear | 346 | 422 | 22 |
| Men's underclothing and hose | 163 | 172 | 6 |
| Women's outerwear | 527 | 738 | 40 |
| Women's underclothing and hose | 216 | 234 | 9 |
| Children's wear | 177 | 210 | 19 |
| Infants' wear | 89 | 118 | 32 |
| Hats, gloves and others | 228 | 228 | – |
| ALL CLOTHING | 1,746 | 2,122 | 22 |

The most important change anticipated in the growth rates of the various sectors is a reduction in the rate of growth of expenditure on women's outerwear. There are four main reasons for this assumption; firstly, the very high figure observed in the past decade is probably over-estimated by the choice of terminal dates, since the rise between 1957 and 1967 was only 61 per cent. Secondly, the increase in the number of women working, which was 25 per cent in the earlier period, is expected to be only 12 per cent in the next decade. Thirdly, in the United States, unlike the United Kingdom, recent expenditure on women's wear has not been rising significantly faster than expenditure on menswear. Finally, expected changes in the age structure of the population referred to above are likely to be particularly significant in this field. Women in the 15-29 age group account for 26 per cent of the adult female population but about 50 per cent of purchases of ladies' outerwear. Taken together, these facts are expected to more than offset any acceleration in the trend towards higher pay for women. Again because of the changes in the age structure of the population, a small decline in the rate of growth of menswear has been assumed.

### 6.3 Fundamental consumer requirements

The choice of fabric for a particular use will depend on a wide range of fabric properties. In preparing forecasts of consumption, it is necessary to consider those properties which can be affected by the choice of raw material or the manufacturing process. These can be summarised as follows:

| *Suitability and appeal* | *Performance in use* |
|---|---|
| Weight | Insulation (warmth) |
| Design complexity | * Stability |
| Colour brightness | Tensile strength |
| Stretch | Abrasion resistance (wearing quality) |
| Drape | * Shrink resistance |
| Texture | * Dirt resistance |
| Transparency/opacity | Shine resistance |
| | Snag resistance |
| | * Crease resistance |
| | * Crease retention |
| | Non-flammability |
| | Absorption |

The first column includes those properties which can be readily observed by an inspection of the fabric such as might be expected at the point of sale. The second column is concerned with the way in which fabric performs subsequent to purchase, and includes characteristics which cannot be readily observed. These are known from experience and by reputation, and include those features which are promoted in respect of various fibres and fabrics.

The relative importance of the properties listed will, of course, depend on the purpose for which the fabric is intended. One group which is certainly important, however, is that which can be considered to contribute to the 'easy care' properties of the cloth. These have been marked with an asterisk. Easy care is important because it is currently regarded by the public as the chief disadvantage of wool as such when compared with man-made fibres, and also because this factor has been receiving increasing emphasis in recent years. This trend is expected to continue for a number of reasons. Perhaps the most obvious is the growth in the use of domestic washing machines, although the rate of growth is expected to decline. Between 1957 and 1967 the proportion of households with a washing machine rose from 20 per cent to 62 per cent. It is unlikely that this proportion will rise above 75 per cent by 1975, although there may be increasing use of launderette facilities. Another factor is the increase in the number of married women working. Figures obtained from the Department of Employment and Productivity show that this number has grown from 4 million to 5 million between 1957 and 1966, and a figure of 5.6 million is forecast for 1975. It has been suggested that the increase in dry-cleaning costs is also an important factor, but in fact these costs have grown no faster than the average for all retail prices. Perhaps the most important reason for increased emphasis on easy care properties is the general shift in attitude towards work in the home. Many recent trends, such as the growth in popularity of convenience foods, are symptomatic of this change.

The other important characteristic which influences the choice between wool and man-made fibre is warmth. This is at the moment seen as the most significant advantage that wool possesses. It is, however, a factor of decreasing importance. This is partly because of an increase in the proportion of homes which have central heating. This proportion is 20 per cent at present, and is expected to rise to between 40 and 45 per cent by 1975. Another important factor is the increase in car ownership, which will rise from the present figure of 0·195 cars per head to about 0·31 cars per head in 1975.

The emphasis in this article has been on those fabric characteristics which influence the choice between fibres. To put these influences in perspective, however, it should be pointed out that other characteristics such as appearance, style, design and fit are even more important to determining choice of garment, certainly so far as women are concerned. It must also be observed that men attach very much less importance to easy care properties than do women.

## 6.4 The economics of customer choice

In addition to the properties of fabrics described in Article 6.3, the other consideration affecting choice, both at the final consumer level and at the clothing industry level, is cost. It is therefore necessary to understand how costs of finished fabrics are built up, and to what degree the properties of fabrics made by different processes are similar; that is, to what extent they could compete in a particular market or end-use.

Considerable technical developments have been made in recent years in non-woven fabric-producing processes, and clearly future patterns of fabric consumption cannot be forecast realistically without an assessment of these products and processes. The list of processes described below is by no means exhaustive, but is thought to contain all those which could have a significant impact in the next few years.

### *Weft knitting*

The main product of the weft knitting industry which competes directly with the products of the wool textile industry is jersey fabric. Cost comparisons are extremely difficult to make, as raw materials, width or diameter of machine, pattern scope, batch size and shift system operated are all relevant. Depending on these factors, and the precise specifications of the products, it is possible for either the jersey or the woven fabric to be the cheaper. The example shown in Figure 12.4 (a) implies that weft knitting cost is about the same as pirnless weaving cost, but cheaper than automatic weaving, although the difference in raw material costs would probably compensate for this. In general it would seem that cost differences between weft knitted and woven fabrics are not a major cause of shifts of demand, particularly as fabric cost represents only 35-50 per cent of finished garment cost and 10-30 per cent of retail price. Certainly in the field of women's outerwear, where jersey fabric has made the greatest inroads, consumer surveys indicate that style, appearance, fit, washability and warmth all take precedence over price when the decision to purchase is being made.

### *Warp knitting*

Conventional warp knitting takes place mainly in the cotton fabric weights, but modified warp knitting processes have recently been developed (such as Co-we-nit and weft insertion) which can produce fabrics similar to worsteds. These fabrics currently have some design limitations, but on the other hand can produce effects not possible in weaving. Production costs are on average some 10 per cent lower than for pirnless weaving, although the example quoted in Figure 12.4 (b) is about 15 per cent cheaper. Because of the product's similarities with conventional worsted fabric, there should be relatively little consumer resistance, and it is therefore concluded that modified warp knitting will take up a significant share of the future market for worsted-type cloths.

### *Stitch bonding*

Whilst there are both yarn and web based methods of stitch bonding, it is the former which produces cloth directly competitive with conventional products. When fine yarns are used, stitch bonding appears to have about a 5 per cent cost advantage over the comparable worsted fabric, but at worsted counts below about 2/22's this disappears. It would seem that if stitch bonding (e.g. the Malimo process) is adopted in this country, it will largely be limited to specialities; this is certainly the trend in the USA, where Malimo operators appear to be concentrating on producing designs which cannot be obtained by other methods.

### *Needle punching*

This process can be applied to blankets and carpets; needle punched fabrics have poor stability and drape, so that they tend to be unsuitable for apparel uses. Needle loom blankets are now well-established products, forming some 25 per cent of blanket output, their main advantage being that they have the same thermal properties but only about 80 per cent of the fibre weight of woven blankets.

Needle punched carpets are little-used in this country, although they are more common in the USA. Any cost advantages they have over tufted carpets seems to be marginal at present. Since they do not possess some of the desirable properties of conventional carpets, such as 'spring', it is not thought that sales of needle loom carpets will become significant during the period of the forecast.

### *Adhesive bonding*

This process is now widely used for the production of interlinings. It is thought that the process is slightly cheaper than conventional stitching of worsted interlinings; its main advantage accrues during making-up, and also in the maintenance of improved garment drape during wear.

Uses other than for interlinings are currently small, and although it may be used for underwear ('paper'-type) its effect on the industry's markets is not likely to be large.

### *Slit-film fabrics*

Current applications are limited to packaging and ropes, although small quantities are used in the USA for car upholstery and commercial furnishing fabrics. Regularity of fibres has proved difficult to obtain, and therefore applications are limited to fairly coarse fabrics. In the long-term, slit-film yarns may prove to be adequate substitutes for continuous filament yarns, but this is not thought likely before 1975.

### *Paper-type fabrics*

The sole attraction of this type of fabric is its extreme cheapness. Although the necessary strength, rigidity, wear and moisture resistance can be obtained by reinforcement or lamination, draping characteristics are poor, and applications are envisaged mainly where stiffness and disposability are required, for example, nurses' uniforms. It is not thought that paper-type fabrics will compete on a broad front with woven or knitted fabrics before 1975.

*Lamination*

Lamination is widely used at present; in the USA there is large-scale production of single-jersey fabric laminated to warp knitted acetate backings. This composite cloth is not significantly cheaper than double-jersey fabrics of the same weight, but its characteristics can be different. Greater strength, rigidity and opacity can be achieved, together with effects such as 'see-through' patterns and bicolour effects. The impact of lamination is thus closely linked with fashion requirements, and there seems no major economic reason for lamination to affect the overall market for cloth.

### 6.5 Consumption of apparel fabrics

It is now possible to break down the forecast expenditure on the categories of clothing given in Article 6.2 into expenditure on particular garments, and then to consider the fabric demand derived from these forecasts. All forecasts of expenditure will be in terms of constant prices, so that no attempt is necessary to predict price changes for individual garments. However, in some cases a trend is foreseen towards a more expensive or higher-quality garment within a garment group, so that the average price for that group will increase even at constant prices. Allowances for changes of this sort have been made.

*Menswear*

Sales of suits have been roughly constant over the past few years. The suit is largely regarded as suitable for office work and for formal occasions, and there is no evidence of this attitude changing. Some growth is likely, however, mainly because of the growing proportion of non-manual work. There is certainly an increasing demand for the higher-quality type of suit, so that expenditure has been rising; allowance has been made for the continuation of this trend.

Demand for trousers can be considered in two groups, work trousers and casual trousers. As disposable income rises, expenditure on clothing tends to become more specialised, so that garments purchased for one purpose are no longer regarded as suitable for another. The result of this is that sales of trousers for casual wear will tend to increase, while sales of work trousers are more likely to decrease, because they are worn less often (not in the evenings or at weekends) and thus last longer. A second effect which is important in the expanding economy is the increasing importance of impulse purchases. This tends to favour the less-expensive items of clothing, as does the existence of a more-rapidly changing fashion scene, since the less-expensive items can be more readily replaced as fashion changes. This comment, of course, applies with even greater force in the women's wear field.

Sales of jackets have risen slightly over the past few years. Although largely an item of casual wear, the jacket is relatively expensive, and thus sales are not expected to grow as fast as those of trousers. There is, however, a marked trend away from the classic woollen sports jacket and towards a lighter garment. This has resulted in a fall in average retail price, and allowance has been made for a continuation of this trend.

Sales of men's knitwear have declined slightly in the past few years, but because of the trend towards casual wear and the importance of impulse purchase, an increase in total sales is foreseen. There has also been a marked trend towards higher quality, which is expected to continue. There has been a marked decrease in sales of topcoats which will certainly continue, as it has in the United States.

Table 6.3 gives 1967 sales of menswear in quantity and value terms, in addition to forecasts for 1975. The figure of £378 m for total expenditure on men's outerwear has been built up from consumer spending figures of sales of individual garments, and may be compared with the figure of £346 m in Table 6.2 taken from the National Income and Expenditure Accounts. This is considered good agreement, bearing in mind the problems of data collection and reconciliation involved.

Table 6.3 – Forecast of home consumption of men's outerwear

| *Garment* | *1967 consumption* | | *Percentage increase in expenditure 1967-1975* | *1975 consumption* | |
|---|---|---|---|---|---|
| | *m garments* | *£ m* | | *£ m* | *m garments* |
| Suits | 9·0 | 148 | 15 | 170 | 10·0 |
| Trousers | 32·0 | 92 | 37 | 126 | 42·0 |
| Jackets | 6·9 | 48 | 29 | 62 | 9·0 |
| Coats | 2·4 | 26 | –8 | 24 | 2·2 |
| Rainwear | 2·7 | 18 | 11 | 20 | 3·1 |
| Knitwear | 17·0 | 46 | 26 | 58 | 18·0 |
| ALL OUTERWEAR | – | 378 | 22 | 460 | – |

Having derived a forecast of garment sales, it is now necessary to divide these into the various types of fabrics which may be used. Table 6.4 shows the amounts of each type of fabric used in various items of menswear in 1967, and gives forecasts for 1975.

Table 6.4 – Use of fabrics in men's outerwear

| | *Consumption of fabrics (m sq yd)* | | | | | |
|---|---|---|---|---|---|---|
| | *Worsted woven* | | *Woollen woven* | | *Knitted* | |
| *Product* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Suits | 43·0 | 37·4 | 3·0 | 2·0 | – | 8·5 |
| Trousers | 22·4 | 24·4 | 1·4 | 2·0 | – | 6·3 |
| Jackets | – | – | 13·0 | 13·5 | 5·5 | 6·5 |
| Coats | 1·0 | 1·0 | 7·0 | 6·4 | – | – |
| Rainwear | 5·2 | 6·0 | – | – | – | – |
| Interlinings | 11·4 | 2·0 | – | – | – | – |
| Others | 0·5 | 0·5 | 5·5 | 3·5 | – | – |
| TOTAL | 83·5 | 71·3 | 29·9 | 27·4 | 5·5 | 21·3 |

The conventional woven worsted suit will certainly continue to dominate the suit market. However, because this is so large and so important to the worsted sector of the industry, it is important to consider the likely penetration of knitted fabrics into this field. Weft knitted double-jersey suits are already available, although sales are extremely small at the moment. This type of suit is said to have the advantages of added comfort and easy care properties. The handle of the fabric is quite different from the conventional suit, however, and it is felt that the conservatism of the British male is likely to limit the penetration of a new and different fabric into his most formal garment. A further disadvantage of the weft knitted suit is the draughtiness caused by its relatively open structure. The other knitted fabric which may achieve a significant penetration into the suit market is modified warp knitted, currently typified by the Co-we-nit and weft insertion machines. This is an extremely new product, the performance of which cannot be considered entirely proven, but it has received very great interest, and a large number of machine prototypes have been sold. Its advantage in the present context is that it is able to simulate woven fabric very much more closely than weft knitting, and it is therefore anticipated that with its slight cost advantage it will achieve a rather larger share of the suit market. It is acknowledged, however, that the penetration of both types of knitted fabric into the suit market represents perhaps the biggest area of doubt in the whole of this chapter. The other important trend anticipated in the suit market is a continuation of the trend away from all-wool worsted and towards polyester-worsted and polyester-modified-rayon blends.

Similar arguments can be applied to trends in the trouser market; the main difference is that trousers are generally more of a casual garment and therefore more susceptible to penetration by novel products and fibres. A somewhat larger penetration by knitted fabrics and man-made fibres is therefore anticipated. The decline in the popularity of woollen jackets has already been mentioned, and this is expected to continue. However, since the total jacket market is growing quite rapidly, sales of woollen jackets are expected to remain approximately constant. The share of woollen fabric in the coat market has been assumed constant, as has the share of worsted fabric in rainwear. Forecasts for knitwear will be summarised in a later section of this article.

Although it has been necessary, because of requirements of other parts of the study, to reach a singular forecast for consumption of each type of fabric, it is also important to indicate in which areas the greatest variation from these forecasts is likely. Single figures for worsted, woollen and knitted fabrics for menswear are given in Table 6.4; as mentioned above, the main uncertainty of these forecasts is the degree of penetration of knitted fabrics, so that bands of reasonable confidence can be stated as follows:

| | *Best estimate* | *Range* |
|---|---|---|
| Worsted woven fabric | 71·3 | 65 to 80 m sq yd |
| Woollen woven fabric | 27·4 | 25 to 30 m sq yd |
| Knitted fabric | 21·3 | 10 to 25 m sq yd |

These intervals are largely subjective judgements, and it would therefore be inappropriate to attempt to associate a specific probability level to them. They are intended to indicate reasonable bands of confidence against which the sensitivity of various future policies can be assessed.

*Women's wear*

Table 6.5 shows how total expenditure on women's outerwear in 1967 was divided amongst the various types of garment. It also gives forecast expenditure for 1975 and relates this to numbers of garments in each category. Since rainwear is in general bought for functional purposes, it is not expected to share fully in the high growth anticipated for women's wear as a whole. Sales of topcoats have been fairly stable in recent years, and although some increase in expenditure is expected, this will be associated with a trend towards a higher-quality garment, with the result that suedes and furs may well increase their market share.

Table 6.5 – Forecast of home consumption of women's outerwear

| | *1967 consumption* | | *Percentage increase in expenditure* | *1975 consumption* | |
|---|---|---|---|---|---|
| *Garment* | *m garments* | *£ m* | *1967-1975* | *£ m* | *m garments* |
| Rainwear | 5·9 | 28 | 8 | 30 | 6·4 |
| Topcoats | 12·3 | 140 | 15 | 160 | 13·0 |
| Suits | 10·3 | 95 | –10 | 86 | 9·3 |
| Dresses | 52·2 | 205 | 55 | 373 | 81·0 |
| Skirts | 18·9 | 40 | 20 | 48 | 22·7 |
| Trousers | 6·2 | 14 | 93 | 27 | 12·0 |
| Jackets | 2·0 | 9 | 67 | 15 | 3·3 |
| Knitwear | 46·3 | 92 | 45 | 133 | 67·0 |
| ALL OUTERWEAR | – | 623 | 40 | 872 | – |

A continuation of the recent trend away from suits and towards dresses and separates of all kinds will be assumed. This assumption is in line with the current movement towards more informality in dress, and a further point is that rapid changes in fashion tend to favour the less expensive types of garment, as they can be more readily replaced. Dresses are expected to grow considerably faster than the average rate for women's wear as a whole, partly because of the trend towards more specialisation in clothing, and partly because of the growing importance of impulse buying. All separates, taken as a whole, are assumed to grow at the same rate as total women's outerwear, but within this category a trend towards trousers and jackets and away from skirts, blouses and knitwear is expected. In this context it may be noted that in the United States sales of trousers have trebled in the last ten years, mainly because of their popularity among younger women. The growth rate assumed in this report implies a rather lower degree of popularity in the United Kingdom.

It is now necessary to consider the types of fabric to be used in the manufacture of these garments. Table 6.6 gives usage of worsted, woollen and knitted fabric in women's wear in 1967 and forecasts for 1975.

Table 6.6 – Use of fabrics in women's outerwear

| | *Consumption of fabrics (m sq yd)* | | | | | |
|---|---|---|---|---|---|---|
| | *Worsted woven* | | *Woollen woven* | | *Knitted* | |
| *Product* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Rainwear | 1·9 | 2·0 | – | – | – | – |
| Topcoats | 1·5 | 1·5 | 29·5 | 27·0 | 4·0 | 8·0 |
| Suits | 1·5 | 1·0 | 17·0 | 11·5 | 17·5 | 23·0 |
| Dresses | 1·5 | 1·5 | 19·0 | 22·5 | 50·5 | 97·0 |
| Skirts | 2·5 | 2·0 | 16·5 | 13·5 | 5·0 | 15·5 |
| Trousers | 0·5 | 1·0 | 0·5 | 1·0 | 5·5 | 9·5 |
| Jackets | – | 0·5 | 2·0 | 2·5 | – | – |
| Retail fabrics | 1·0 | 1·0 | 14·0 | 13·5 | 5·0 | 6·0 |
| Others | – | – | 5·0 | 5·0 | – | – |
| TOTAL | 10·4 | 10·5 | 103·5 | 96·5 | 87·5 | 159·0 |

About 8 per cent of rainwear is currently made in wool and polyester-worsted blends. This share of the market is expected to remain about the same, though a trend towards more mixtures and less pure wool is expected. Fabrics in woven wool, wool-rayon and wool-cotton mixtures account for about 63 per cent of topcoats. Of the total coat market, about two-thirds are winter coats, and in this sector wool is likely to remain the dominant fibre because of its reputation for warmth. Its share will be somewhat reduced, however, because of the trend towards suedes and furs associated with rising incomes. In the summer coat market, increasing competition may be expected from jersey fabrics.

The most notable trend in the suit and dress markets in the last few years has been the growth of jersey fabrics in modified-filament polyester. A further increase in the use of this fabric may be expected, particularly since recent developments will permit more attractive designs to be made available, and since more attention is likely to be paid to design, colour and style. Thus in the suit market the proportion of woven fabric is likely to be smaller, but of this the share of woollen fabric will be rather more, since jersey will compete most with the lighter-weight cotton and nylons. In the dress market, however, a decline may be expected in the proportion of woven wool, partly because of the increasing emphasis on easy care properties and the lessening interest in warmth, and partly because much of the increase in demand will be for other than the autumn and winter dresses in which woven wool fabric has its biggest market. Some decline is expected in the use of spun yarn in jersey fabrics for similar reasons.

The most notable recent trend in the skirt market has been the decline of polyester-wool blends associated with the fashion swing away from the pleated skirt. Jersey fabric has only a small share of this market, although it is growing rapidly, and this is expected to continue. Woven wool fabrics have only a very small share of the trouser market, in which nylon is the dominant fibre. A constant share of this rapidly-growing market is assumed.

As in the case of menswear, it is instructive to consider the degree of likely variation from these estimates. There is always difficulty in forecasting the size of a rapidly-growing market at a particular point of time in the future. For this reason, the biggest uncertainty exists in the estimate for consumption of knitted fabric. Ranges of reasonable confidence are given below:

| | *Best estimate* | *Range* |
|---|---|---|
| Worsted woven fabric | 10·5 | 8 to 12 m sq yd |
| Woollen woven fabric | 96·5 | 90 to 100 m sq yd |
| Knitted fabric | 159·0 | 150 to 170 m sq yd |

*Children's wear*

Table 6.7 gives 1967 figures and future estimates for the use of materials in children's wear. The influence of a number of other materials is expected to lead to a slower growth for woven wool fabrics than for children's wear as a whole. A continuation of the present trend away from the traditional gabardine raincoat is expected in favour of anoraks and nylon rainwear. In girls' outerwear a movement away from tunics and towards dresses, skirts and knitwear is anticipated. Jersey fabric is likely to continue to increase its share of this market.

**Table 6.7 – Use of fabrics in children's wear**

| | *Consumption of fabrics (m sq yd)* | | | | | |
|---|---|---|---|---|---|---|
| | *Worsted woven* | | *Woollen woven* | | *Knitted* | |
| *Garment* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Topcoats | – | – | 2·0 | 2·0 | – | – |
| Rainwear | 3·0 | 2·0 | – | – | – | – |
| Blazers | 0·5 | 0·5 | 4·5 | 5·5 | – | – |
| Boys' suits, jackets and trousers | 4·5 | 3·5 | 1·5 | 1·0 | 0·5 | 0·5 |
| Girls' dresses, suits, skirts and tunics | 1·5 | 1·5 | 2·0 | 1·5 | 8·5 | 11·5 |
| TOTAL | 9·5 | 7·5 | 10·0 | 10·0 | 9·0 | 12·0 |

*Contract clothing*

The past and future pattern of consumption of fabrics in uniform and contract clothing is given below, in million square yards:

| | *1967* | *1975* |
|---|---|---|
| Worsted woven fabric | 3.0 | 5.0 |
| Woollen woven fabric | 6.0 | 3.0 |
| TOTAL | 9.0 | 8.0 |

It may be seen that an overall decline in consumption is expected, due to the continued run-down of the armed forces and a reduction in the number of employees in public services such as railways. These factors are unlikely to be offset by the growth in other services such as hotels and airlines. A continuation of the existing trend from woollen to worsted has also been assumed.

*Knitwear*

The forecast of home consumption of knitwear is given below, in terms of finished garment weight in millions of lb:

| | *1967* | *1975* |
|---|---|---|
| Menswear | 16 | 16 |
| Women's wear | 36 | 55 |
| Children's wear | 5 | 6 |
| Underwear | 6 | 5 |
| Socks and stockings | 2 | 2 |
| Other knitwear | 9 | 9 |
| TOTALS | 74 | 93 |

Important differences exist in the pattern of fibre usage in men's and women's knitwear. Wool remains the dominant fibre in men's knitwear, largely because of its warmth properties, and this situation is likely to be maintained. In women's knitwear, however, wool's share of the market has fallen from 63 per cent to 27 per cent since 1960, reflecting the popularity of acrylics and nylons, and the easy care properties of these fibres. This trend is expected to continue, but at a reduced rate, since wool is likely to maintain its position in the high-quality end of the knitwear market.

### 6.6 Consumption of non-apparel fabrics

The development of consumption forecasts from consumer expenditure through to cloth requirements used in the previous article is not appropriate for non-apparel fabrics. This is partly because fabrics of interest to the wool textile industry supply only a small proportion of the total market, and partly because the statistics needed to prepare the forecasts in this way are not available. A more direct approach has therefore been used to assess both the growth of the total market and the trends in the market share of wool textiles.

*Upholstery*

The following figures show consumption of fabrics in upholstery in 1967, together with forecasts for 1975, in millions of square yards:

| | *1967* | *1975* |
|---|---|---|
| Worsted woven cloth | 6·0 | 4·5 |
| Woollen woven cloth | 3·0 | 3·0 |
| Knitted fabric | 20·0 | 25·0 |
| TOTAL | 29·0 | 32·5 |

In general, the forecasts represent a continuation of present trends. For convenience, all non-apparel uses of plush and pile fabrics have been included with the worsted cloth, and it is this category which accounts for most of the decline forecast by 1975. Consumption of woollen cloth has been taken to be constant, largely because of the growth of nylon jersey fabrics in stretch covers. This fairly new development is growing rapidly, and is now used for both loose and fitted covers. It has a number of advantages over conventional woven fabrics, such as easy care properties and the ability to replace the cover independently of the piece of furniture itself. Further growth in the use of this fabric is therefore anticipated.

*Blankets*
Sales of blankets have declined slightly in the past few years. This has been due mainly to growth in the use of central heating in bedrooms, and, to a lesser extent, the use of electric blankets. It is interesting to note that blanket sales exhibit a less-marked seasonal pattern than in the past, indicating that the use of extra blankets in winter is now less common. As these factors are likely to become more important, a continuation of the decline in sales is anticipated. Forecasts for 1975 are given below:

| | *1967* | *1975* |
|---|---|---|
| No. of blankets (millions) | 6·2 | 5·5 |
| No. of cot blankets (millions) | 0·8 | 0·7 |
| Total area (m sq yd) | 32·6 | 28·4 |
| Woven blankets (m sq yd) | 25·1 | 12·5 |

The figures in the final line above give the share of the total market to be taken by woven blankets. The remainder will be satisfied by needle punched blankets and by knitted blankets. These non-woven blankets have a significant cost advantage, and are expected to obtain the major share of the market by 1975.

Wool is likely to remain the dominant fibre in all types of blankets, mainly because of its reputation for warmth.

## 6.7 Consumption of carpet yarns

Figure 6.2 shows the dramatic growth in the share of the total floor covering market achieved by tufted carpets over the last few years. This has largely been at the expense of the traditional hard floor coverings, which are expected to decline still further in the future. The major competitors in the floor covering market by 1975 are likely to be carpets and vinyl floorings of various kinds, with tiles in a number of other materials being used for specialist purposes. Carpets, of course, have a number of important advantages over hard floor

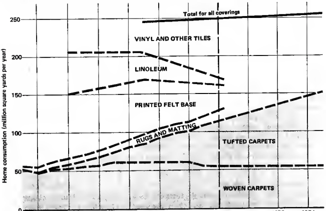


FIGURE 6.2 – TRENDS IN CONSUMPTION OF FLOOR COVERINGS

coverings, such as comfort, sound-deadening, etc., and their only real disadvantage is price. Tufted carpets have already reduced the price differential considerably, and are now being used in many non-traditional applications such as bedrooms and bathrooms. Perhaps the most important market for carpets in the future, however, is in shops, offices, hotels, etc. where the cost of cleaning and maintenance is important, which reduces still further the cost disadvantage of carpets.

A number of processes have recently been developed for producing carpets from fibre without using a spun yarn. None of these have as yet made a significant impact on the British market, and have disadvantages when compared with conventional carpets, such as lack of a springy texture. Their influence is assumed to be small up to 1975. All of the growth forecast for carpets is therefore assumed to be taken up by the tufted sector. Table 6.8 gives forecasts of total pile weight for both types of carpet, together with a break-down into the various types of spinning likely to be used. The highest growth is expected in semi-worsted yarn, although a considerable advance in the use of nylon filament yarns is also anticipated. A trend towards higher quality in tufted carpets is likely to result in the share of woollen yarns remaining the same.

Table 6.8 – Use of yarns in carpets

| | *Consumption of yarns (m lb)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Worsted* | | *Woollen* | | *Semi-worsted* | | *Filament* | | *Cotton* | |
| *Product* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Woven carpets | 7 | 7 | 112 | 110 | – | – | – | – | – | – |
| Tufted carpets | – | – | 13 | 23 | 39 | 93 | 7 | 23 | 25 | 16 |
| TOTAL | 7 | 7 | 125 | 133 | 39 | 93 | 7 | 23 | 25 | 16 |

The use of wool in woven carpets has declined rapidly in the last few years, being displaced by nylon and modified-rayon fibres. This trend is expected to continue, but at a reduced rate. Little wool is used in tufted carpets, and this usage may increase somewhat.

### 6.8 Consumption of hand knitting yarns

A number of motives exist for hand knitting. In some cases real economies can be achieved, particularly in the case of children's and infants' wear. More often, however, a comparable machine knitted garment would cost little more. Perhaps the most important reason for hand knitting is that it is a rewarding craft which satisfies a desire for creativity. It also permits a garment to be produced which is unique and can be distinguished from a mass-produced article. Although, in the long-term, attitudes to leisure are likely to change, this is likely to be a slow process, and this report assumes that the market for hand knitting yarns will remain roughly constant up to 1975. There have been fairly radical fluctuations in the past, but these can largely be attributed to changes in fashion, which cannot be forecast. The trend away from wool towards synthetics is expected to continue, largely because of their easy care properties and to a lesser extent because brighter colours are available in synthetics.

### 6.9 Summary of the forecasts

It is now possible to gather together the forecasts made in the previous four articles in order to obtain overall forecasts for the products of the wool textile industry. Table 6.9 shows the summary of fabric forecasts.

Table 6.9 – Summary of forecasts of home consumption of fabrics

| | *Consumption of fabrics (m sq yd)* | | | | | |
|---|---|---|---|---|---|---|
| | *Worsted woven* | | *Woollen woven* | | *Knitted* | |
| *Product* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Menswear | 83·5 | 71·3 | 29·9 | 27·4 | 5·5 | 21·3 |
| Women's wear | 10·4 | 10·5 | 103·5 | 96·5 | 87·5 | 159·0 |
| Children's wear | 9·5 | 7·5 | 10·0 | 10·0 | 9·0 | 12·0 |
| Contract clothing | 3·0 | 5·0 | 6·0 | 3·0 | – | – |
| Upholstery | 6·0 | 4·5 | 3·0 | 3·0 | 20·0 | 25·0 |
| Blankets | – | – | 25·1 | 12·5 | – | – |
| TOTAL | 112·4 | 98·8 | 177·5 | 152·4 | 122·0 | 217·3 |
| Total weight (m lb) | 69 | 63 | 131 | 115 | 56 | 100 |

In assessing the overall ranges of confidence, it is necessary to consider the way in which likely errors suggested in earlier articles will combine when the forecasts are added. In general, this will depend upon the degree of correlation between errors in various fields. Only if such errors are entirely correlated will they add arithmetically. In this particular case, some correlation must be expected, since the success of a particular fabric in one area is likely to be associated with the same fabric's success in another. The overall bands of doubt have been assessed with these arguments in mind, and are given below.

| | *Best estimate m sq yd* | *Range m sq yd* | *Range m lb* |
|---|---|---|---|
| Worsted woven cloth | 98·8 | 90 to 110 | 55 to 67 |
| Woollen woven cloth | 152·4 | 145 to 160 | 105 to 120 |
| Knitted fabric | 217·3 | 200 to 230 | 92 to 108 |

Table 6.10 summarises forecasts of yarn consumption, including the yarn content of Table 6.9.

Table 6.10 – Summary of forecasts of home consumption of yarns

| | *Consumption of yarns (m lb)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Worsted* | | *Woollen* | | *Semi-worsted* | | *Filament* | |
| *Use* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Worsted weaving | 72 | 66 | – | – | – | – | – | – |
| Woollen weaving | – | – | 141 | 124 | – | – | – | – |
| Knitted fabrics | 16 | 27 | – | – | – | – | 41 | 76 |
| Knitwear | 62 | 76 | 8 | 8 | – | – | 6 | 11 |
| Carpets | 7 | 7 | 125 | 133 | 39 | 93 | 7 | 23 |
| Hand knitting | 37 | 39 | 2 | 2 | – | – | 2 | 5 |
| TOTAL | 194 | 215 | 276 | 267 | 39 | 93 | 56 | 115 |

Bands of doubt have been assessed as before, and may be stated as follows:

| | *Best estimate* | *Range* |
|---|---|---|
| Worsted yarn | 215 | 190 to 235 m lb |
| Woollen yarn | 267 | 240 to 290 m lb |
| Semi-worsted yarn | 93 | 80 to 105 m lb |
| Filament yarn | 115 | 100 to 130 m lb |

It is of interest to examine the future trends in consumption of these products implied by the detailed forecasts, and compare these with trends in the past as shown in Figure 6.1. If account is taken of the bands of doubt given above, it may be seen that consumption of both woollen and worsted yarn may be expected to remain roughly constant, that both woollen and worsted fabrics will continue to decline slowly, and that knitted fabric and semi-worsted yarns will continue to increase rapidly. Thus the forecasts are generally in accordance with past experience. The most important change anticipated is a likely upturn in worsted yarn consumption. The knitted fabric curve on Figure 6.1 includes knitwear, and thus is not directly comparable with the knitted fabric figures in Table 6.9.

It remains to consider trends in fibre usage. Table 6.11 breaks down the figures for total yarn consumption into their fibre constituents. The very marked trend away from wool and towards man-made fibres reflects the views expressed throughout many parts of this chapter concerning this trend. It also represents a continuation of similar movements in the past.

Table 6.11 – Fibre usage in yarns

| | *Consumption of fibres (m lb)* | | | | | |
|---|---|---|---|---|---|---|
| | *Wool and hair* | | *Man-made* | | *Waste* | |
| *Yarn* | *1967* | *1975* | *1967* | *1975* | *1967* | *1975* |
| Worsted | 117 | 106 | 77 | 109 | – | – |
| Woollen | 136 | 106 | 72 | 102 | 68 | 59 |
| Semi-worsted | – | – | 39 | 93 | – | – |
| TOTAL | 253 | 212 | 188 | 304 | 68 | 59 |

# Chapter 7 International cost competitiveness

## 7.1 Forecasting trading competitiveness

Chapter 6 studied the demand for wool textile products in the United Kingdom up to the mid-1970's irrespective of possible sources of supply. It is probable that the British industry would supply the bulk of the home demand, but this will largely be a result of the prices that the industry charges compared with those of its competitors, rather than a natural occurrence. To determine what share of the home market the industry can in fact expect to take, it is necessary to determine the cost structure of the United Kingdom industry compared with the cost structures of its competitors, and hence to ascertain the markets profitably available to the industry. Similarly, export markets are available to the wool textile industries of every country, but in each locality each national industry will be faced with a certain potential profitability in competition with other industries, and a comparison of the fundamental cost differences of each competing industry will indicate their ranking and the magnitude of their potential profits.

It will be noticed that no attempt has been made to forecast the overall consumption level of wool textile products in countries outside the United Kingdom. This is because the total market of the world is to all intents and purposes infinite in comparison with potential United Kingdom production, and it is unlikely that the British industry would be so competitive outside the United Kingdom that it was faced as a matter of policy with determining the upper limit of its export sales. It is sufficient to know that within the larger part of the market for wool textile products outside the United Kingdom, particularly in Western Europe and the USA, tastes are sufficiently similar for the products of the British industry to be acceptable with little modification.

There are broadly three methods of comparing international production costs. The first is to derive the most representative method of production of each product currently used in each country to be considered, and apply to this method the normal costs of productive resources obtainable at the present time. This method, if practicable, would give a complete understanding of cost variations at present, but would be of limited application for forecasting competitiveness in the mid-1970's. Secondly, a process optimisation could be undertaken for every country under consideration to determine in each national environment the optimum method of producing each class of product. Again the normal costs of productive resources could then be applied to each national production model. This method would reveal the ultimate level of international competitiveness; any deviation from the optimum in any country would enable an optimum British practice to be even more competitive than would be shown. The method would, however, involve an immense amount of data collection, and is probably little more accurate than the method used in this chapter. This is to use a common process model relating to the optimum method of production in a British environment and apply to it the basic cost differences incurred in buying the various productive resources in each country. This method will not explain current apparent price differences and might indeed provide a somewhat contrary result, but it will reveal substantially the underlying competitiveness of each country.

Clearly there are likely to be substantial differences between calculated costs and actual market prices. One possible variation is that of product variation, producers competing for the same market by providing slightly different products. An example of this would lie in the field of women's fashion woollen fabrics, where a wide variety of blends of raw materials are equally competitive. Secondly, even in such a rigorous study of competitive costs it is still virtually impossible to identify unofficial subsidies, tax avoidance schemes and the like. To partially overcome this imperfection, it will be possible to compare calculated cost differences with actual price differences, any variation being attributable to the non-measurable factors mentioned above.

In order to compare international competitiveness over a wide range of wool textile products, the cost calculations were undertaken for a number of products representative of the ranges of production and of significant cost variations. These representative products are as follows:

60/64's merino tops, French combed;
2/28's, worsted yarn, top dyed, spun from the above top;
Medium Bradford type worsted fabric, 9.3 oz per sq yd, woven from the above yarn;
1/12's YSW woollen yarn, stock-dyed;
Ladies' fancy coating, 13 oz per sq yd, woven from the above yarn;
Double-jersey knitted fabric, 7.4 oz per sq yd, 1/34's dry spun yarn, spun from the representative top.

Below are listed the representative producing and consuming countries showing the assumed centres of production and consumption for each country. In general, countries chosen as producers have also been regarded as importers, with the exception of the final eight countries listed below. The major port for each country involved in the calculations is also listed.

| *Country* | *Production centre* | *Consumption centre* | *Port* |
|---|---|---|---|
| Australia | Melbourne | Melbourne | Melbourne |
| Belgium | Verviers | Brussels | Antwerp |
| Canada | Montreal | Montreal | Montreal |
| France | Roubaix | Paris | Calais |
| West Germany | Gronau | Rhineland | Bremen |
| Italy | Biella | Lombardy | Genoa |
| Japan | Nagoya | Nagoya | Nagoya |
| Netherlands | Tilburg | Amsterdam | Rotterdam |
| Portugal | Covilha | Lisbon | Lisbon |
| South Africa | Port Elisabeth | Uitenhage | Port Elisabeth |
| South Korea | Pusan | Pusan | Pusan |
| Sweden | Borås | Stockholm | Göteborg |
| United Kingdom | Bradford | London | London |
| Uruguay | Montevideo | – | Montevideo |
| USA | Lawrence | Boston | Boston |
| USSR | Bryansk | Moscow | Riga |
| Austria | – | Vienna | via Rotterdam |
| Brazil | – | São Paulo | Santos |
| Greece | – | Athens | Piraeus |
| Hong Kong | – | Hong Kong | Hong Kong |
| Indonesia | – | Djakarta | Djakarta |
| Kenya | – | Mombasa | Mombasa |
| Kuwait | – | Kuwait | Kuwait |
| Lebanon | – | Beirut | Beirut |

The countries chosen as representative consuming countries were selected to provide reasonable coverage of tariff and transport cost variations. Four of the consuming countries, Brazil, Indonesia, Kuwait and Lebanon, when studied revealed virtually no differences in their patterns of profit opportunities from other countries with no preferential tariff arrangements, such as Hong Kong or Kenya. Results for these countries are not, therefore, presented in detail. Uruguay was also not regarded as a potential consumer for reasons discussed in the next article.

Figure 7.1 shows the location of each representative consumption area, those countries marked in red also being producers. Producing countries have been selected so as to provide a wide range of labour and transport costs, and not necessarily on the basis that they already have a sizeable wool textile industry. They have also been treated as though they could produce all types of wool textile products, even though certain sectors of their industries are as yet embryonic or even non-existent. This will permit their relative competitiveness to be understood in the event of sudden investment in new capacity.

It should be noted that in the case of Italy only the 'industrial' practice of the Biella region has been included. The activities of the Prato manufacturers are so different in terms both of raw materials and operating practices, that they cannot be compared with those of other countries in any significant manner.

### 7.2 Basic costs at home and abroad

The first stage in understanding international competitiveness is to establish basic costs of productive resources in the various producing countries. Table 7.1 summarises the basic costs used in the study, expressed as indices with United Kingdom costs as the base. Each heading of this table will be discussed in greater detail later in this article, but two observations should be made about the table. Producing countries have been listed in order of their total wage costs, an order which will be maintained throughout this chapter in view of the close relationship between total wage cost and total production cost. Secondly, other cost centres (such as consumable materials or maintenance materials) were shown to have insufficient variation to justify detailed study. Cost items which do not appear in Table 7.1 (other than tariffs and transport) are therefore assumed to be common to all producers.

Table 7.1 – Summary of basic cost indices

| | *Indices of costs (United Kingdom = 100)* | | | | | | |
|---|---|---|---|---|---|---|---|
| *Country* | *Labour* | *Staff* | *Australian average 64's* | *Australian average 50's* | *Electricity* | *Steam* | *Capital charges* |
| South Korea | 12 | 17 | 104 | 102 | 109 | 100 | 100 |
| Uruguay | 25 | 50 | 178 | 168 | 120 | 117 | 100 |
| Portugal | 26 | 54 | 103 | 105 | 143 | 134 | 100 |
| South Africa | 41 | 83 | 95 | 93 | 98 | 107 | 101 |
| Japan | 53 | 86 | 95 | 92 | 109 | 97 | 102 |
| USSR | 93 | 111 | 102 | 103 | 79 | 109 | 110 |
| United Kingdom | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| France | 109 | 142 | 99 | 99 | 93 | 119 | 117 |
| Italy | 111 | 156 | 98 | 98 | 109 | 99 | 115 |
| Belgium | 130 | 197 | 100 | 99 | 121 | 96 | 108 |
| Netherlands | 134 | 134 | 99 | 99 | 103 | 105 | 115 |
| West Germany | 152 | 168 | 100 | 100 | 130 | 107 | 110 |
| Australia | 160 | 173 | 91 | 87 | 91 | 118 | 108 |
| Sweden | 185 | 205 | 100 | 100 | 31 | 111 | 109 |
| Canada | 188 | 188 | 99 | 99 | 40 | 113 | 110 |
| USA | 238 | 213 | 119 | 138 | 63 | 109 | 101 |

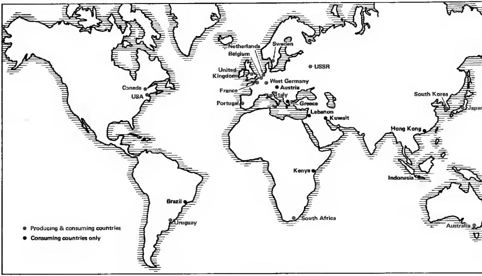


FIGURE 7.1 — REPRESENTATIVE PRODUCERS AND CONSUMERS

*Raw materials*

To eliminate any differences due to varying characteristics of different types of wool and their influence on subsequent processes, a common source of wool has been assumed for all producers. There is clearly considerable lack of realism in stipulating that producers in South Africa, Uruguay or the USA should use only Australian wool, but this assumption in the first place permits analysis of all other cost variables and, secondly, can later be relaxed to indicate potential competitiveness using more readily-accessible materials. In particular, in the case of Uruguay, any domestic wool textile producer is so heavily protected by tariffs that the country's inclusion in the analysis is only justified by its considerable manpower cost advantages. The wool for the representative worsted products is an average 64's Australian merino, and that for the woollens is a good 50's Australian.

The cost of the wool to the mill includes the following elements:

(a) Basic wool sale price, taken as 110d per lb c/s for merino, and 55d per lb c/s for crossbred;
(b) Ocean freight, taken as 0·5d per lb per 1000 nautical miles;
(c) Land transport;
(d) Import tariffs, in the case of Portugal, South Korea, USA and Uruguay;
(e) Allowances for processing losses.

Taking all these factors into consideration the resulting index of wool costs are as shown in Table 7.1. The United Kingdom costs (indexed as 100) for the average 64's were 130·15d per lb of top, and, for the good 50's, 60·83d per lb of yarn.

It will have been noted that none of the representative products studied contains man-made fibres. The exclusion of these from the detailed cost calculations was entailed by the lack of reasonable comparative information on international fibre costs, since different product specifications, marketing arrangements and so on, destroy any comparability. To allow for any underlying international variations, however, the effect on the calculations of the introduction of man-made fibres into the products studied is discussed where appropriate.

*Manpower*

There are four basic elements making up comparative costs of manpower. These are wage costs of labour, salary costs of management, other manpower costs (social security, holiday pay etc.) and productivity.

Fairly comprehensive and comparable information was obtained on the first three of these elements. Included in 'other manpower costs' were allowances for the different hours normally worked per year in each country. Productivity variations would then consist of variations due to different machinery installed, and variations due to inherently differing human abilities. Since the assumption of common products and process methods avoided consideration of the former, the data required as the basic cost of manpower should preferably have incorporated allowances for the latter. However, unlike many other industries, there is little comparative international data on productivity variations in wool textile industries, and considerable manipulation of available earnings, production, and plant statistics did not yield comprehensive meaningful results. The assumption, albeit imperfect, was therefore made that the same process model, of an optimal, three-shift operation, could be operated in each country, and that the cost of manpower required would be the present true cost of manpower corrected for variations in hours worked per year but assumed to be equally adaptable, at no extra cost, in each country to the processes adopted.

Data on labour earnings and other labour-related costs were obtained largely from the German Textile Employers' Federation, covering all the European countries, together with the USA, Canada and Japan. Data on the remaining countries (other than South Africa) were obtained from the International Labour Office; figures for South Africa were largely estimated from unpublished sources. In all cases, all possible checks were made against data from other sources and these in general proved the consistency and accuracy of the figures used. Data relating to salaries were less easily accessible and were usually obtained from records of average differentials between salaries and wages. The component indices of the total wage costs and total salary costs for the sixteen producing countries are shown below in Table 7.2.

Table 7.2 – Computation of wages and salaries indices

| | *Wages index* | *Other costs (per cent of wages)* | *Cost of labour index* | *Salaries to wages ratio* | *Cost of staff index* |
|---|---|---|---|---|---|
| South Korea | 11 | 30 | 12 | 2·60 | 17 |
| Uruguay | 25 | 20 | 25 | 3·70 | 50 |
| Portugal | 26 | 22 | 26 | 3·70 | 54 |
| South Africa | 45 | 10 | 41 | 3·75 | 83 |
| Japan | 47 | 36 | 53 | 3·00 | 86 |
| USSR | 80 | 40 | 93 | 2·25 | 111 |
| **United Kingdom** | **100** | 20 | **100** | 1·85 | 100 |
| France | 84 | 56 | 109 | 2·40 | 142 |
| Italy | 75 | 78 | 111 | 2·60 | 156 |
| Belgium | 103 | 51 | 130 | 2·80 | 197 |
| Netherlands | 112 | 43 | 134 | 1·85 | 134 |
| West Germany | 129 | 41 | 152 | 2·05 | 168 |
| Australia | 174 | 10 | 160 | 2·00 | 173 |
| Sweden | 178 | 25 | 185 | 2·05 | 205 |
| Canada | 205 | 10 | 188 | 1·85 | 188 |
| USA | 242 | 18 | 238 | 1·65 | 213 |

It can be seen that whereas basic earnings in the United Kingdom are, as would be expected, fairly high relative to most European countries, this disadvantage is considerably reduced when other earnings-related costs to the employer are taken into account. For example, social security payments in Italy and Belgium tend to dwarf those made in this country, and the number of statutory holidays in the United Kingdom is among the lowest in the world. The United Kingdom also benefits considerably by its ability to pay women a considerably lower proportion of male earnings than many other countries, including most of the European Economic Community.

The cost of manpower is the only cost element in which significant variations in international comparative indices could be expected to arise in the future. Forecasts of future earnings are, however, extremely complex and unreliable, so in the calculations it has been preferred to demonstrate changes in labour indices necessary to remove delivered-cost differences. As a measure of the likelihood of some of these index changes being realised, however, it is possible to demonstrate what these comparative labour cost indices would be in 1975 if each country's average labour earnings grew at the same rate as they have done over the last decade, re-expressing the new indices in terms of the future United Kingdom cost:

| | *1968 labour earnings index* | *1975 labour earnings index* |
|---|---|---|
| South Korea | 11 | 16 |
| Uruguay | 25 | – |
| Portugal | 26 | 26 |
| South Africa | 45 | – |
| Japan | 47 | 63 |
| USSR | 80 | 73 |
| United Kingdom | 100 | 100 |
| France | 84 | 89 |
| Italy | 73 | 87 |
| Belgium | 103 | 105 |
| Netherlands | 112 | 129 |
| West Germany | 129 | 155 |
| Australia | 174 | 142 |
| Sweden | 178 | 182 |
| Canada | 205 | 180 |
| USA | 242 | 197 |

It will be seen that labour earnings in the United Kingdom have grown considerably more slowly than those in the EEC or in the low-cost competitors (6·3 per cent annually compared with 6·6 per cent for Portugal, 7·1 per cent for France, 9·1 per cent for West Germany, 10·9 per cent for Japan and 12·5 per cent for South Korea). Growth rates for earnings in Uruguay are too susceptible to exchange rate fluctuations to be meaningful, and none were available for South Africa. The table indicates, therefore, that the United Kingdom has improved its competitive position over the last decade, and it would require quite startling changes in relative growth rates for this advantage to be removed.

*Mill services*

Figures on comparative electricity costs were generally obtained from the Electricity Council, or occasionally direct from appropriate generating or distributing boards. In some cases the information was provided in the form of average industrial costs per unit, in other cases the industrial tariff was obtained from which a unit charge appropriate to average wool textile operation could be derived. Despite a lack of comparability in this approach the variations in this item do not significantly affect the results of the calculations.

The cost of steam was determined largely as a derivative of the component costs of generating it, and variations in the costs of fuel oils, labour and capital were incorporated in the calculations. Comparative fuel oil prices were obtained from Shell International Ltd.

*Cost of capital*

Comparative costs of capital were derived from a study of variations in corporation taxes, depreciation allowances, investment grants and the like. It will be seen that in general outside Europe there is little variation in the cost of capital from that in the United Kingdom, but within the EEC a generally high level of corporation tax, coupled with low depreciation allowances, gives the United Kingdom a considerable advantage. Insufficient information could be found for South Korea, Portugal or Uruguay to permit detailed calculations, and the estimate least favourable to the United Kingdom was therefore made in these three cases.

*Transport*

To facilitate calculations, average sea and land transport costs were synthesised, although it is appreciated that actual sea costs depend considerably on traffic densities, return-voyage

## Table 7.3—General rates of import tariffs

| *Importing country* | *Duties (ad valorem rates or pence per lb to nearest penny)** | | | | | |
|---|---|---|---|---|---|---|
| | *Tops* | *Worsted yarns* | *Woollen yarns* | *Worsted woven cloth* | *Woollen woven cloth* | *Double-jersey knitted cloth* |
| *Australia:* | | | | | | |
| From Commonwealth | Free | 11·5% + 5d | 10% + 4d | 22·5% or 84d† | 22·5% or 60d† | 20% |
| From rest | 5d | 17·5% + 9d | 17·5% + 9d | 45% or 107d† | 45% or 76d† | 30% |
| *Austria:* | | | | | | |
| From EFTA | Free | Free | Free | Free | Free | Free |
| From rest | Free | 7·2% | 7·2% | 16% + 18d | 16% + 18d | 22% |
| *Canada:* | | | | | | |
| From Commonwealth | Free | Free | Free | 20% + 18d | 20% + 18d | 20% |
| From rest | 5d | 10% + 9d | 10% + 9d | 25% + 23d | 25% + 23d | 27·5% |
| *EEC members* | 3% | 5% | 5% | 18% | 18% | 13% |
| *Greece:* | | | | | | |
| From EEC | 1d | 31d | 31d | 190d | 108d | 215d |
| From rest | 1d | 36d | 36d | 222d | 127d | 254d |
| *Hong Kong* | Free | Free | Free | Free | Free | Free |
| *Japan:* | Free | 5% | 5% | 15% or 108d† | 15% or 78d† | 16% |
| *Kenya:* | 30% | 30% | 30% | 45% | 45% | 45% or 113d† |
| *South Korea:* | 35% | 80% | 80% | 100% | 100% | 100% |
| *Portugal* | | | | | | |
| From EFTA | 12d | 37d | 37d | 123d | 99d | 105d |
| From rest | 22d | 72d | 72d | 242d | 194d | 210d |
| *South Africa:* | Free | 12·5% + 12d | 12d | 20% or 96d† | 20% or 96d† | 20% |
| *Sweden:* | | | | | | |
| From EFTA | Free | Free | Free | Free | Free | Free |
| From rest | Free | 6% | 5% | 14% or 43d† | 14% or 43d† | 14% |
| *United Kingdom:* | | | | | | |
| From Commonwealth‡ | Free | Free | Free | Free | Free | Free |
| From EFTA | Free | Free | Free | Free | Free | Free |
| From rest | 10% | 7·5% | 7·5% | 17·5% | 17·5% | 17·5% |
| *USA:* | 6% + 28d | 15% + 30d | 15% + 30d | 38% + 38d | 113d | 20% + 37d |
| *USSR:* | Free | Free | Free | Free | Free | Free |

* Tariff discrimination against the communist block by Austria, Canada, South Africa and the USA are excluded from the table.

† Whichever is the greater.

‡ The UK treats imports from South Africa and Eire as for the Commonwealth.

possibilities and the number of port calls. Nevertheless a charge of 0·5d per lb per 1,000 nautical miles appears to conform with most sea transport costs incurred. Most land journeys of more than a few miles cost, in pence per lb, 0·16 plus 0·027 times the number of miles. To allow for handling charges, a minimum of 0·2d per lb for any one journey has been assumed.

*Tariffs*

Table 7.3 summarises the general import tariffs levied by the representative consuming countries on imports of the selected representative wool textile products. Where applicable, the tariffs have been taken to be those obtaining at the end of the Kennedy Round tariff reductions. In the case of Portugal, reductions under the EFTA agreement have been estimated at the proposed 1970 level, beyond which no precise programme of reduction appears yet to have been decided. Where appropriate, allowance is made in the calculations for tariff preferences such as those given between EFTA, Commonwealth, or EEC members.

It is important to observe that throughout the body of calculations in this chapter it has been assumed that the United Kingdom remains outside the Common Market. The consequences of the United Kingdom obtaining membership are, however, analysed in the final article of the chapter.

It can be seen from Table 7.3 that the United Kingdom is roughly as well protected from yarn and cloth imports as the major trading nations, and is one of the most heavily protected against top imports. On the other hand, it is the only country which is a member of two major trading communities giving tariff-free preference to other members.

## 7.3 Assessment of competitiveness in an overseas market

In this article the calculations will be shown in detail for one representative product being sold in one selected market; the later articles will be concerned with the remaining representative products, and will discuss all the markets, but in less detail. A worsted cloth (medium Bradford of 9·3 oz per sq yd, 2/28's yarn of 60/64's quality) will be used in the following example.

The first stage in the calculations is to derive the total production costs for the cloth in a United Kingdom environment. Applying to these costs the indices applicable to production in Japan, the total equivalent Japanese production cost can be derived, as shown in Table 7.4.

Table 7.4 – The cost of producing a worsted cloth in Japan

| *Cost element* | *Cost in UK (pence per lb)* | *Cost indices for Japan* | *Cost in Japan (pence per lb)* |
|---|---|---|---|
| Raw material | 133·7 | 95 | 126·9 |
| Labour | 58·1 | 53 | 30·8 |
| Staff | 6·9 | 86 | 5·9 |
| Consumables | 6·3 | 100 | 6·3 |
| Maintenance materials | 5·8 | 100 | 5·8 |
| Electricity | 4·4 | 109 | 4·8 |
| Steam | 1·6 | 97 | 1·6 |
| Overheads | 5·7 | 100 | 5·7 |
| Stockholding | 5·1 | 102 | 5·2 |
| Capital charge | 60·6 | 102 | 61·8 |
| TOTAL | 288·2 | | 254·8 |

It will be seen that there is a slight saving in raw material costs in the Japanese environment (due to lower transport costs from Australia), that the cost of manpower is considerably lower, and that most other costs are little changed. The total production cost is roughly 11 per cent below that in the United Kingdom.

The same procedure can be undertaken for every other representative producing country, and the results of the calculations are summarised graphically in Figure 7.2. It can be seen from this illustration that variations in raw materials cost are significant only in Australia (which benefits from lack of a sea journey) and in South Korea, Portugal and the USA, which impose tariffs on imported wool. The major determinant of variations in production costs is clearly the cost of manpower, although the more expensive cost of capital in the Common Market countries can also be seen to have a certain additional effect.

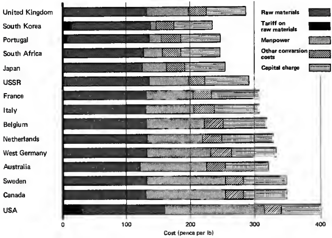


FIGURE 7.2 – OVERSEAS PRODUCTION COSTS FOR A WORSTED CLOTH

Having obtained these costs of production, it is possible to determine the costs of the fabric from each national source delivered to any market; in this example, the market selected for the demonstration is that of Sweden. In Table 7.5 are listed the component elements of the delivered costs to Sweden.

Since the selected market is in Europe, as are most of the producers, transport costs are significant only for South Korea, Japan and Australia. A far more important variation is the EFTA preferential tariff arrangement enjoyed by Portugal and the United Kingdom, which can be seen to give producers in these countries a considerable advantage over their competitors. It should be noted that this EFTA preference is particularly important in Sweden, where there is a minimum tariff on non-EFTA products of 43d per lb.

The most appropriate way of analysing the results of Table 7.5 is to determine the relative profitability of each producing country in the Swedish market. To do this, it has been assumed that the cost of the cloth from the United Kingdom, which is the third lowest in

Table 7.5 – Costs of the worsted cloth in the Swedish market

| *Producing country* | *Cost (pence per lb)* | | | |
|---|---|---|---|---|
| | *Production* | *Transport* | *Import duty* | *TOTAL* |
| South Korea | 237·7 | 6·0 | 43·0 | 286·7 |
| Portugal | 248·5 | 1·5 | – | 250·0 |
| South Africa | 247·3 | 3·9 | 43·0 | 294·2 |
| Japan | 254·8 | 6·2 | 43·0 | 304·0 |
| USSR | 293·7 | 2·0 | 43·0 | 338·7 |
| United Kingdom | 288·2 | 1·2 | – | 289·4 |
| France | 307·1 | 0·9 | 43·1 | 351·1 |
| Italy | 307·1 | 1·9 | 43·3 | 352·3 |
| Belgium | 318·1 | 0·9 | 44·7 | 363·7 |
| Netherlands | 319·2 | 0·8 | 44·8 | 364·8 |
| West Germany | 331·1 | 0·9 | 46·5 | 378·5 |
| Australia | 320·9 | 6·2 | 45·8 | 372·9 |
| Sweden | 348·8 | 0·7 | – | 349·5 |
| Canada | 348·9 | 2·1 | 49·1 | 400·1 |
| USA | 401·3 | 2·1 | 56·5 | 459·9 |

the market, would tend to set the price levels. In this case, therefore, it can be said that United Kingdom producers would achieve their 'normal' level of profits, as contained in the 20 per cent (of total capital cost) capital charge. Since South Korean producers can be seen to have nearly a 3d per lb advantage (duty-paid) over United Kingdom producers, they could therefore earn a slightly higher than 'normal' profit. A similar calculation can be made for each producer, the results being as follows:

| *Producer* | *Profitability index, competing with UK price* |
|---|---|
| Portugal | 165 |
| South Korea | 104 |
| United Kingdom | 100 |
| South Africa | 92 |
| Japan | 76 |
| USSR | 26 |
| France | 13 |
| Sweden | 9 |
| Italy | 7 |
| Netherlands | –8 |
| Belgium | –13 |
| Australia | –27 |
| West Germany | –33 |
| Canada | –66 |
| USA | –178 |

It will be seen from this listing that Portugal, which enjoys the same EFTA preference as the United Kingdom, can increase its capital charge by 65 per cent in competition with a fabric price set by that of United Kingdom producers. On the other hand, cloth from Italy could contain only 7 per cent of the normal level of capital recovery in competition with United Kingdom fabric. Another interpretation of this profitability measure is that United

Kingdom producers competing with cloth imported by other competitors could achieve only 35 per cent of their normal level of capital recovery in competition with Portugal, 96 per cent in competition with South Korea, and 124 per cent in competition with Japan, if those countries' costs were determining the competitive price level.

Having determined the basic levels of competitiveness in accordance with the costs derived in Article 7.2 it is possible to treat the calculations as a model in which selected cost elements can be varied at will. For example, if the Swedish import tariff on worsted cloth were removed so that all imports of cloth entered the country duty-free, a revised set of profitability indices would be necessary, as listed below:

| *Producer* | *Profitability index, competing with UK price* |
|---|---|
| South Korea | 175 |
| Portugal | 165 |
| South Africa | 162 |
| Japan | 146 |
| United Kingdom | 100 |
| USSR | 90 |
| France | 74 |
| Italy | 71 |
| Netherlands | 56 |
| Belgium | 55 |
| Australia | 42 |
| West Germany | 36 |
| Sweden | 9 |
| Canada | 8 |
| USA | −86 |

From these it can be seen that in a tariff-free environment, United Kingdom producers would be in a far worse competitive position than under the present tariff system, being vulnerable even to cloth imports from EEC countries which did not attempt to recover a full capital charge. A similar picture would apply if EFTA preference were removed from Portugal and the United Kingdom, a major change from the tariff-free situation being that the profitability of Swedish producers in competition with United Kingdom imports would rise to 70 per cent of their normal capital charge. The effect of removing the tariffs on raw wool imports imposed by South Korea, Portugal and the USA would be to raise their profitability indices in the normal situation from 119, 165 and −178 to 146, 175 and −128 respectively. Variations in transport costs, both of raw material and of finished products, have been tested, but found to have insignificant effects on competitiveness in the market.

A second cost element which can be varied is that of manpower, to demonstrate the sensitivity of the calculations to possible changes in wages and salaries. The list opposite shows what changes to each country's total manpower cost index would be necessary for each country's product to be landed in Sweden at the same cost as that of the United Kingdom.

| *Producer* | *Assumed manpower cost index* | *Revised manpower cost index to match assumed market prices* |
|---|---|---|
| South Korea | 13 | 17 |
| Portugal | 29 | 90 |
| South Africa | 45 | 38 |
| Japan | 56 | 34 |
| USSR | 95 | 18 |
| United Kingdom | 100 | 100 |
| France | 112 | 18 |
| Italy | 115 | 19 |
| Belgium | 139 | 25 |
| Netherlands | 134 | 21 |
| West Germany | 153 | 22 |
| Australia | 163 | 39 |
| Sweden | 187 | 95 |
| Canada | 188 | 12 |
| USA | 235 | (negative) |

Thus, only in the case of South Korea is it likely that the growth of labour costs might be such as to remove the competitive advantage of South Korean fabric over that from the United Kingdom. Elsewhere, necessary labour cost changes are either such as to make low-cost countries relatively cheaper still, or are improbably large.

### 7.4 United Kingdom competitiveness in tops

As mentioned in Article 7.1 the top selected as being sufficiently representative of normal top production to provide a fair international comparator is 60/64's Australian merino, dry combed. The production costs for such a top combed in a United Kingdom environment are detailed below:

*UK top production costs (pence per lb)*

| | |
|---|---|
| Raw material (net) | 125.5 |
| Labour | 6.3 |
| Staff | 0.9 |
| Consumables | 0.5 |
| Maintenance materials | 1.1 |
| Electricity | 0.9 |
| Steam | 0.3 |
| Other overheads | 0.6 |
| Stockholding | 1.2 |
| Capital charge | 6.7 |
| TOTAL | 144.0 |

Applying the indices of international cost variations as demonstrated in the previous article, Figure 7.3 can be drawn, showing the varying total production costs for this top in the sixteen representative producing countries. The wide range of variation can be seen to be caused largely by import tariffs levied on Australian wool; nevertheless, excluding these, there is still a considerable difference between the lowest production cost (that of South Korea at 131.8d per lb) and the most expensive, which is that of the United States at 151.6d per lb. Such variations are due almost entirely to differences in the cost of

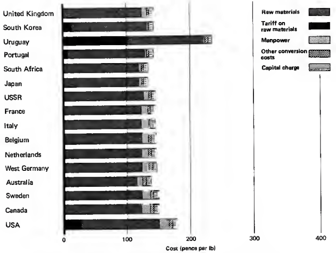


FIGURE 7.3 – OVERSEAS PRODUCTION COSTS FOR A MERINO TOP

labour. Advantages in the cost of transport of raw wool from Australia clearly benefit producers in South Africa, Japan and South Korea, as well as those in Australia itself.

Applying to these production costs the cost of transport to selected consuming countries together with any import tariffs levied by those countries, the delivered costs of the representative top from each producer to each consumer can then be derived. Table 7.6 contains a derivation of the table that this operation produces, showing the change in each country's capital recovery factor which would be needed to enable that country's delivered cost to equal that of the assumed price-setter in each market place. For example, in the United Kingdom it is probable that comparative price levels would be determined by home-produced tops, so that the UK should achieve its 'normal' profitability of 100. However, South African producers competing with these tops could increase their level of capital recovery by 78 per cent without incurring any cost disadvantage compared with British producers. Since South Africa is the country with the highest profitability index, it ranks first in the UK market; as shown in Table 7.6, the ranking of countries then proceeds with the United Kingdom second, Australia third, Portugal fourth, and Canada fifth. Australian producers would have to reduce their level of capital recovery by 8 per cent to compete with British producers, whilst Portugal would have to reduce by 16 per cent.

A similar operation can be carried out for each consuming country (the price-setter in each case being taken as that country which in practice appears likely to dominate competition), the results of such calculations being shown in Table 7.6.

It can be seen that the four most favoured importers of tops into the United Kingdom are all countries which, through EFTA or Commonwealth tariff arrangements, avoid the 10 per cent import tariff normally levied. (It is observed that the benefit of Commonwealth preference given to South Africa by the United Kingdom and Canada is not fully reciprocated.) Similarly, in Portugal, British and Swedish tops obtain relatively high comparative rankings

Table 7.6 – International competitiveness in a merino top

| *Market* | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | South Africa | 178 | United Kingdom | **100** | Australia | 92 | Portugal | 84 | Canada | 1 | 2nd | **100** |
| Austria | South Africa | 178 | Japan | 152 | Australia | **100** | Italy | 80 | Portugal | 66 | 6th | 65 |
| Portugal | Portugal | **100** | United Kingdom | –118 | South Africa | –141 | Japan | –165 | Sweden | –177 | 2nd | –118 |
| Sweden | South Africa | 185 | Japan | 148 | Australia | **100** | Portugal | 91 | United Kingdom | 85 | 5th | 85 |
| Belgium | South Africa | 152 | Japan | 116 | Italy | 103 | France | **100** | Belgium | 86 | 10th | 50 |
| France | South Africa | 150 | Japan | 109 | France | **100** | Italy | 94 | Netherlands | 76 | 10th | 41 |
| Germany | South Africa | 150 | Japan | 113 | Italy | **100** | France | **100** | Netherlands | 85 | 10th | 50 |
| Italy | South Africa | 132 | Japan | 107 | Italy | **100** | France | 68 | Australia | 58 | 10th | 42 |
| Netherlands | South Africa | 154 | Japan | 116 | France | **100** | Italy | 99 | Netherlands | 89 | 10th | 53 |
| Greece | South Africa | 178 | Japan | 154 | Australia | **100** | Italy | 76 | Portugal | 71 | 6th | 51 |
| USSR | South Africa | 190 | Japan | 151 | Australia | **100** | Portugal | 91 | United Kingdom | 87 | 5th | 87 |
| Hong Kong | Japan | 175 | South Africa | 141 | Australia | **100** | South Korea | 49 | Portugal | –1 | 7th | –29 |
| Japan | Japan | **100** | South Africa | 40 | Australia | 15 | South Korea | –40 | Portugal | –104 | 7th | –104 |
| South Korea | South Korea | **100** | Japan | –324 | South Africa | –375 | Australia | –382 | Portugal | –529 | 7th | –549 |
| Canada | South Africa | 181 | Australia | **100** | Japan | 77 | United Kingdom | 63 | Portugal | 32 | 5th | 32 |
| USA | South Africa | 144 | Japan | 120 | USA | **100** | Australia | 74 | Portugal | 41 | 6th | 41 |

by virtue of their partial tariff preference. In Austria and Switzerland, however, the lack of any normal tariff barrier against tops means that non-EFTA countries are the most-favoured top producers. Throughout the EEC the common external tariff is insufficient to deter the import of South African and Japanese tops; however, it is likely that French or Italian combers would tend to set price levels, with which the United Kingdom could compete only by accepting very low levels of capital recovery. The height of the tariff barrier in South Korea is clearly demonstrated by the extreme advantage given to local producers over any importer; a similar situation occurs in the USA, where American producers, even with their very high cost of labour, can undercut tops imported from Australia. It should be noted that another interpretation of this profitability index gives an indication of how far importing countries can afford to drop their prices to compete with importers: for example, throughout the Common Market, South African combers would be able in the long run to force out of competition top producers from any other country, since they could still be earning a return on their capital when their competitors were charging only operating costs. It is interesting to note how unnecessary the 10 per cent tariff protection given to British combers appears to be, since Japan alone of the very low-cost producers is adversely affected by the barrier; Portugal, which receives EFTA preference, and South Korea are more seriously hampered by their own import duties on wool. A barrier of 2 per cent would be sufficient to equate the prices of Japanese and British tops.

A similar exercise can be carried out, again as was demonstrated in the previous article, to show changes in labour costs which would be necessary to equate all countries' delivered costs with those of the price setter in each market place. The figures listed in Table 7.7 show that in the United Kingdom, for example, the cost of manpower for South Africa could be 2½ times the assumed level without removing South Africa tops from first place; on the other hand, a 5 per cent reduction in Australian manpower costs would make Australian tops as cheap as British ones. Other manpower cost reductions to change the competitive ranking in the United Kingdom would be too great to be conceivable. In Austria, where the assumed price-setting country is Australia, the cost of manpower in South Africa, Japan and Australia could rise vis-à-vis the United Kingdom by 290 per cent, 180 per cent and 50 per cent respectively without endangering their competitive position against the United Kingdom. In general, except for Common Market countries competing within the EEC, no conceivable changes in manpower costs could change the main patterns of competitiveness in any of the consuming countries, four examples of which are shown in Table 7.7.

The removal of tariffs charged on wool imports into South Korea, Portugal, Uruguay and the USA would further depress the competitive position of United Kingdom exporters of tops, since, as shown in Figure 7.3, producers in three of these countries have extremely low production costs if these tariffs are excluded. This is of particular relevance when widening the application of this exercise to understand competitiveness throughout the whole spectrum of top production, since clearly Uruguayan producers have an immense cost advantage in the production of crossbred tops over producers in most other countries, provided their local wool is of satisfactory quality.

Removal of the import tariffs on top imports into other countries would make comparatively little difference to competition outside the Common Market, since in many cases tariff barriers already in existence are breached by EFTA or Commonwealth preferential arrangements; removal of the Portuguese tariff would mean that Portugal would no longer have so striking an advantage in its own market, and would be vulnerable to imports from South Africa. In general, free trade in tops would mean that imports into most countries would follow the pattern of production costs—that is, that South African, Japanese, Australian and Portuguese tops would tend to be preferred in most markets, with South Korean and Uruguayan exports also being competitive if there was no tariff in these countries on wool imports.

Table 7.7 – Sensitivity of competitiveness in tops to manpower costs

| *Producing country* | *Assumed total manpower cost index* | *Revised manpower index to match assumed prices in the markets* | | | |
|---|---|---|---|---|---|
| | | *United Kingdom* | *Austria* | *France* | *USA* |
| South Korea | 13 | –250 | –90 | –228 | –300 |
| Portugal | 29 | 14 | – 4 | – 47 | – 86 |
| South Africa | 46 | 119 | 179 | 200 | 286 |
| Japan | 57 | – 85 | 160 | 141 | 250 |
| USSR | 94 | –168 | 46 | – 47 | –1,428 |
| United Kingdom | 100 | 100 | 100 | 100 | 100 |
| France | 113 | –108 | 102 | 253 | 86 |
| Italy | 115 | –106 | 140 | 244 | 123 |
| Netherlands | 133 | –106 | 106 | 240 | 91 |
| Belgium | 138 | –104 | 113 | 247 | 96 |
| West Germany | 153 | –124 | 98 | 225 | 59 |
| Australia | 161 | –153 | 242 | 278 | 441 |
| Sweden | 186 | 83 | 100 | 109 | 118 |
| Canada | 188 | 86 | 81 | 84 | 186 |
| USA | 233 | –464 | –438 | –713 | 764 |

Again, as was shown in Article 7.3, effects of changes in transport costs are insignificant and no further reference will be made to these in this chapter.

The cost structure in the production of other types of wool top is broadly similar to those of the representative top studied here; the basic cost of raw material and the cost of labour basically determine the pattern of competitiveness. The conclusions based on cost competitiveness so far reached, therefore, would tend to obtain throughout the whole spectrum. The use of local wool by Uruguayan producers has already been discussed and can be taken to be broadly representative of any other South American producer; the use of local wools by South African producers would tend slightly to reduce their advantage since their local wools are generally priced somewhat higher than those from Australia. It is necessary to bear in mind also, however, the states of development of combing industries in these countries, since South African producers currently specialise only in very high grades, Australian producers rely largely on oil combing rather than dry combing (and would therefore tend to be unacceptable in the Common Market) and combing in South Korea, Portugal and South America is as yet either negligible or of dubious quality. Nevertheless the importance of low labour costs is clearly demonstrated, and the serious competition which has been shown from very low cost producers is bound to develop, together with similar competition from producers such as India, Egypt and Taiwan.

### 7.5 United Kingdom competitiveness in yarns

The representative products for which a detailed analysis is being made in this chapter were selected both as being reasonably typical of the wool textile industry's production in their own right, and because on both the worsted and the woollen side the semi-processed products were suitable for further processing into the later products. The worsted yarn selected is a 2/28's dry spun yarn, which could be produced from the 60/64's top analysed in Article 7.4, and will itself be suitable for manufacture into the worsted fabric to be studied in Article 7.6. Similarly the woollen yarn (a 1/12's yarn produced from good 50's wool) is a suitable raw material for the ladies' fancy coating to be considered also in the next article.

*Worsted yarns*

Production costs of the representative worsted yarn are shown below:

*UK worsted yarn production costs (pence per lb)*

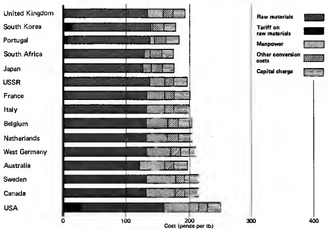
| | |
|---|---|
| Raw material (net) | 133·5 |
| Labour | 21·4 |
| Staff | 2·5 |
| Consumables | 4·7 |
| Maintenance materials | 3·4 |
| Electricity | 3·4 |
| Steam | 0·9 |
| Other overheads | 2·9 |
| Stockholding | 1·2 |
| Capital charge | 20·3 |
| TOTAL | 194·2 |

As in the previous article, the international cost indices can be applied as appropriate to derive Figure 7.4(a) which shows the variations in the total costs and component cost areas of this yarn produced in fifteen countries. A pattern of variation can be seen to be emerging of four low-cost producers, all of whom have particularly cheap manpower, several producers in Europe and elsewhere whose costs are not significantly different, and the USA, which suffers particular penalties of a very high labour cost and a tariff on raw material.

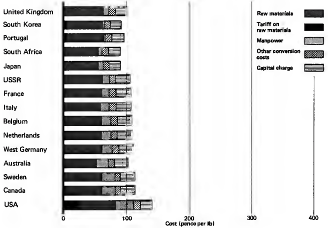
From the figures in this illustration combined with transport costs and import tariffs can again be derived a table of delivered costs, an analysis of which is shown in Table 7.8. This table again uses the profitability indices to compare competing producers, each country's advantage or disadvantage compared with an assumed price-setting country being shown as a percentage of its normal capital recovery factor. It can be seen that, in general, the pattern of delivered costs follows that of production costs, with producers in South Africa, Japan, Portugal and South Korea being generally favoured except where particularly high import tariffs protect domestic industries or preferred nations. EFTA tariff preference permits the United Kingdom producers to enjoy greater competitiveness within the EFTA region than they would otherwise obtain, although in Portugal there is still considerable protection given to the home industry. In the United Kingdom, Commonwealth preference also encourages the entry of South African yarns. It can be seen that, compared with the lowest cost Common Market producers, British exporters to the EEC fare comparatively well, but are more seriously affected by competition from the four low-cost producers.

As was indicated in the previous article, changes in relative cost of manpower which would significantly affect the patterns of competitiveness are generally so great as to be inconceivable in the reasonable future.

Although Figure 7.4 shows that the tariff on raw wool imports into Korea and Portugal is still relatively large, these tariffs are insufficient seriously to distort the international competitiveness of these countries. Import tariffs on the yarns bought into the various consuming countries are, however, more effective in distorting patterns of trade; the pattern which would be produced in duty-free situations is exemplified by the imports into the USSR and Hong Kong, which are taken to be free of any import tariffs. Thus, were there to be no import tariffs in a European country, United Kingdom producers would tend to be at a severe disadvantage compared with exports from South Africa, Japan, Portugal and South Korea, while enjoying only a slight advantage themselves over other European producers. Under the current United Kingdom tariff arrangements, British producers are protected



(a) A 2/28's worsted yarn



(b) A 1/12's woollen yarn

FIGURE 7.4 – OVERSEAS PRODUCTION COSTS FOR YARNS

Table 7.8 – International competitiveness in a worsted yarn

| *Market* | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | South Africa | 172 | Portugal | 146 | United Kingdom | 100 | Japan | 84 | South Korea | 74 | 3rd | 100 |
| Austria | Portugal | 152 | South Africa | 118 | United Kingdom | 100 | Japan | 100 | South Korea | 90 | 3rd | 100 |
| Portugal | Portugal | 100 | United Kingdom | –148 | South Africa | –235 | Sweden | –217 | Japan | –252 | 2nd | –148 |
| Sweden | Portugal | 153 | South Africa | 124 | Japan | 102 | United Kingdom | 100 | South Korea | 90 | 4th | 100 |
| Belgium | South Africa | 152 | Japan | 134 | Portugal | 131 | South Korea | 127 | France | 100 | 9th | 78 |
| France | South Africa | 157 | Japan | 133 | Portugal | 130 | South Korea | 125 | France | 100 | 8th | 76 |
| Germany | South Africa | 157 | Japan | 134 | Portugal | 131 | South Korea | 127 | France | 100 | 9th | 78 |
| Italy | South Africa | 154 | Japan | 135 | Portugal | 127 | South Korea | 126 | Italy | 100 | 8th | 68 |
| Netherlands | South Africa | 158 | Japan | 135 | Portugal | 133 | South Korea | 127 | France | 100 | 9th | 77 |
| USSR | South Africa | 123 | Japan | 100 | Portugal | 95 | South Korea | 91 | United Kingdom | 43 | 5th | 43 |
| Hong Kong | Japan | 100 | South Africa | 99 | South Korea | 91 | Portugal | 73 | United Kingdom | 19 | 5th | 19 |
| Japan | Japan | 100 | South Africa | 49 | South Korea | 45 | Portugal | 5 | United Kingdom | –55 | 5th | –55 |
| South Korea | South Korea | 100 | Japan | –282 | South Africa | –292 | Portugal | –338 | Australia | –360 | 6th | –395 |
| Canada | South Africa | 185 | United Kingdom | 100 | Australia | 67 | Japan | 46 | Portugal | 41 | 2nd | 100 |
| USA | South Africa | 163 | Japan | 145 | South Korea | 135 | Portugal | 134 | USA | 100 | 6th | 73 |
| Australia | Australia | 100 | South Africa | 14 | Japan | 5 | South Korea | –6 | United Kingdom | –36 | 5th | –36 |

against Japanese and South Korean yarns, but could suffer duty-free competition from Portugal and South Africa were they significant exporters.

The use of imported tops instead of home-produced tops would enable yarns to be produced more cheaply in all but the four lowest-cost producing countries. However, the use of imported yarns would be even cheaper for all except the United States and Australia, where the height of the import tariff in both cases discourages the importation of yarns. From these calculations it is again possible to make broad generalisations about international competitiveness in other types of worsted yarn. In all cases there will be a strong correlation between labour cost variations and trading competitiveness, and the relative profitability of various producers will be little different from that shown in Table 7.8. EFTA markets and Canada will, therefore, remain the most attractive markets for exports of worsted yarns from the United Kingdom, although markets within the EEC should be obtainable provided lower levels of capital recovery are acceptable.

The use of man-made fibres in worsted yarns, and indeed in all wool textile products, would appear at the moment to give United Kingdom producers opportunities of further cost advantages over their Continental competitors. Price lists of non-cellulosic fibres for 1966 to 1968 show that polyester fibres were cheaper in the United Kingdom than in the EEC or Japan even ignoring possible discounts; those of acrylic fibres were only slightly more expensive than equivalent prices in Italy and the Netherlands and cheaper than those elsewhere; but nylon prices were somewhat higher than those in the Common Market. Insufficient information has, however, been obtainable on the cost of man-made fibres in the other countries involved, or about the reasons for the variations in the costs.

*Woollen yarns*

The production costs in the United Kingdom of the representative woollen yarn are as follows:

*UK woollen yarn production costs (pence per lb)*

| | |
|---|---|
| Raw materials | 60·8 |
| Labour | 10·2 |
| Staff | 1·3 |
| Consumables | 4·8 |
| Maintenance materials | 0·9 |
| Electricity | 1·6 |
| Steam | 0·8 |
| Other overheads | 2·3 |
| Stockholding | 0·2 |
| Capital charge | 19·7 |
| TOTAL | 102·6 |

Figure 7.4(b) shows how these costs vary between the fifteen producing countries under review. A striking difference between this figure and that relating to the worsted yarn is the greater proportion of costs taken up by the capital charge, with total manpower costs exceeding capital charge only in the USA. Once again variations in total production cost are caused largely by variations in the cost of manpower, with import tariffs on raw material being significant in Korea, Portugal and the USA, and the saving in raw material transport costs being quite striking in Australia. Table 7.9 contains the analysis in terms of the relative profitabilities of international competitiveness in sixteen representative consuming countries. The pattern of competitiveness from the point of view of British producers is similar to that of worsted yarns, although United Kingdom producers are even more

Table 7.9 – International competitiveness in a woollen yarn

| Market | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | South Africa | 131 | Portugal | 102 | United Kingdom | 100 | Japan | 79 | South Korea | 77 | 3rd | 100 |
| Austria | Portugal | 119 | South Africa | 107 | United Kingdom | 100 | Japan | 95 | South Korea | 92 | 3rd | 100 |
| Portugal | Portugal | 100 | United Kingdom | –121 | Sweden | –152 | South Africa | –253 | Japan | –262 | 2nd | –262 |
| Sweden | Portugal | 120 | South Africa | 108 | United Kingdom | 100 | Japan | 97 | South Korea | 97 | 2nd | 100 |
| Belgium | South Africa | 130 | Japan | 114 | South Korea | 113 | Portugal | 112 | France | 100 | 8th | 92 |
| France | South Africa | 130 | Japan | 112 | South Korea | 111 | Portugal | 110 | France | 100 | 8th | 90 |
| Germany | South Africa | 130 | Japan | 113 | South Korea | 113 | Portugal | 112 | France | 100 | 8th | 92 |
| Italy | South Africa | 126 | Japan | 113 | South Korea | 111 | Portugal | 107 | Italy | 100 | 8th | 81 |
| Netherlands | South Africa | 130 | Japan | 113 | South Korea | 113 | Portugal | 112 | France | 100 | 8th | 92 |
| USSR | South Africa | 119 | Japan | 100 | South Korea | 98 | Portugal | 98 | United Kingdom | 78 | 5th | 78 |
| Hong Kong | Japan | 100 | South Korea | 99 | South Africa | 92 | Portugal | 57 | Australia | 45 | 6th | 29 |
| Japan | Japan | 100 | South Korea | 72 | South Africa | 62 | Portugal | 25 | Australia | 20 | 6th | –2 |
| South Korea | South Korea | 100 | Japan | –109 | South Africa | –124 | Australia | –154 | Portugal | –164 | 6th | –189 |
| Canada | South Africa | 144 | United Kingdom | 100 | Australia | 81 | Canada | 63 | Japan | 41 | 2nd | 100 |
| USA | USA | 100 | South Africa | 99 | Japan | 88 | South Korea | 85 | Portugal | 79 | 6th | 58 |
| Australia | Australia | 100 | South Africa | 22 | Japan | 19 | South Korea | 15 | United Kingdom | 3 | 5th | 3 |

favourably placed in the EEC in comparison both with local producers and with exporters from the four low-cost countries. The same pattern of lower comparative margins applies throughout the countries studied, an indication of the comparatively low level of value-added in this product and the uniformly high proportion within that added-value of capital charge expected by each producer. Because manpower cost is nearly always a lower sum than the cost of capital, the trading margins in terms of manpower costs are always much greater and a slight profitability advantage of Portugal, for example, in the United Kingdom is considerably exaggerated in terms of its cost of manpower. Nevertheless, on the whole, trade in woollen yarns presents a far more satisfactory competitive position for producers in the United Kingdom, and if availability of yarns from very low-cost producers is at all poor, then markets within the EEC are almost as attractive as those in EFTA. As in all wool textile products United Kingdom producers may well have to contend in future with low-cost tariff-free imports into the home market from South Africa and Portugal.

### 7.6 United Kingdom competitiveness in fabrics

Three fabrics were selected as being representative of normal United Kingdom production in fabrics. The worsted woven fabric was described in Article 7.3 and can be manufactured from the yarn discussed in the first part of Article 7.5. The woollen woven fabric can similarly be produced from a woollen yarn such as that discussed in the remainder of Article 7.5. Also studied was a double-jersey knitted fabric, the yarn for which would be a 1/34's dry-spun yarn which could be produced from the top studied in Article 7.4.

*Worsted fabrics*

The production costs of a worsted fabric were shown in Table 7.4, and are repeated below:

*UK worsted cloth production costs (pence per lb)*

| | |
|---|---|
| Raw materials | 133·7 |
| Labour | 58·1 |
| Staff | 6·9 |
| Consumables | 6·3 |
| Maintenance materials | 5·8 |
| Electricity | 4·4 |
| Steam | 1·6 |
| Overheads | 5·7 |
| Stockholding | 5·1 |
| Capital charge | 60·6 |
| TOTAL | 288·2 |

These costs, which are calculated for a United Kingdom environment, can be extended to other national environments using the indices of international costs discussed in Article 7.2, and can then be further extended to give the delivered cost of fabric from each national source to each representative consuming country. Table 7.10 shows how the various leading producers would compete in each selected market.

It will be seen that United Kingdom producers are well placed competitively in EFTA markets, although at a considerable cost disadvantage in these markets compared with Portugal, which receives the same EFTA preference. In markets within the European Economic Community, British producers could expect to obtain only half their normal return on capital in competition with local producers, but in markets where there is no tariff preference, average return on capital would tend to be even lower. Canada and Australia are little more attractive than the Common Market.

Inasmuch as the production costs of this fabric indicate that the cost of manpower and the cost of capital in the United Kingdom are roughly equal, British competitiveness in terms of

Table 7.10 – International competitiveness in a worsted woven fabric

| | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Market* | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | Portugal | 164 | South Africa | 162 | South Korea | 104 | United Kingdom | 100 | Japan | 76 | 3rd | 100 |
| Austria | Portugal | 164 | United Kingdom | 100 | South Korea | 86 | South Africa | 72 | Japan | 58 | 2nd | 100 |
| Portugal | Portugal | 100 | United Kingdom | –169 | Sweden | –238 | South Korea | –288 | South Africa | –298 | 2nd | –169 |
| Sweden | Portugal | 165 | South Korea | 104 | United Kingdom | 100 | South Africa | 92 | Japan | 76 | 3rd | 100 |
| Belgium | South Korea | 128 | Portugal | 117 | South Africa | 115 | France | 100 | Japan | 99 | 10th | 52 |
| France | South Korea | 128 | Portugal | 117 | South Africa | 116 | France | 100 | Italy | 99 | 10th | 51 |
| Germany | South Korea | 127 | Portugal | 117 | South Africa | 115 | France | 100 | Japan | 99 | 10th | 49 |
| Italy | South Korea | 128 | Portugal | 117 | South Africa | 115 | Japan | 100 | Italy | 100 | 10th | 48 |
| Netherlands | South Korea | 128 | Portugal | 117 | South Africa | 115 | France | 100 | Japan | 98 | 10th | 49 |
| USSR | South Korea | 128 | Portugal | 118 | South Africa | 116 | Japan | 100 | United Kingdom | 53 | 5th | 53 |
| Hong Kong | South Korea | 128 | South Africa | 106 | Portugal | 105 | Japan | 100 | United Kingdom | 37 | 5th | 37 |
| Japan | Japan | 100 | South Korea | –51 | South Africa | –71 | Portugal | –76 | United Kingdom | –143 | 5th | –143 |
| South Korea | South Korea | 100 | South Africa | –116 | Portugal | –121 | Japan | –123 | United Kingdom | –189 | 5th | –18 |
| Kenya | South Korea | 117 | South Africa | 104 | Portugal | 100 | Japan | 88 | United Kingdom | 33 | 5th | 33 |
| South Africa | South Africa | 100 | South Korea | –49 | Portugal | –66 | Japan | –74 | United Kingdom | –132 | 5th | –132 |
| Canada | South Africa | 140 | South Korea | 128 | Portugal | 117 | Japan | 100 | Canada | 100 | 6th | 76 |
| USA | South Korea | 126 | Portugal | 116 | South Africa | 114 | Japan | 100 | USA | 100 | 6th | 58 |
| Australia | Australia | 100 | South Korea | 56 | South Africa | 41 | Portugal | 35 | Japan | 30 | 6th | 5 |

manpower cost is roughly the same as that shown in terms of capital charge. For the very-low-cost producers, however, where the manpower cost is a very much smaller sum than the cost of capital, their competitive advantage in terms of their manpower cost is correspondingly greater and indicates that any likely change in the relative costs of manpower would not seriously affect the competitive ranking of the various countries.

The conclusions for countries such as Hong Kong and the USSR are representative of the effect of a tariff-free situation, where exporting countries are favoured more or less in accordance with their pattern of production costs. Figure 7.2 shows that this pattern of costs is of four very cheap producers, a group of European producers with roughly similar costs, and two or three producers whose costs are virtually prohibitive in international trade.

Only five countries—South Korea, South Africa, Japan, Portugal and Australia—could produce cloth more cheaply in a wholly-integrated process; all other countries would benefit in economic terms from importing yarns or, even further, from importing cloth.

*Woollen fabrics*
The United Kingdom production costs of the representative woollen cloth are shown below.

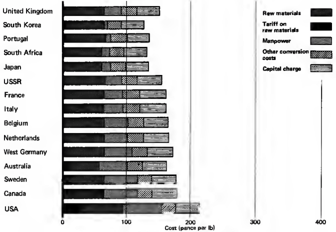
*UK woollen cloth production costs (pence per lb)*

| | |
|---|---|
| Raw materials | 65·7 |
| Labour | 24·9 |
| Staff | 3·1 |
| Consumables | 6·1 |
| Maintenance materials | 1·4 |
| Electricity | 2·7 |
| Steam | 1·8 |
| Other overheads | 3·9 |
| Stockholding | 7·3 |
| Capital charge | 35·1 |
| TOTAL | 152·0 |

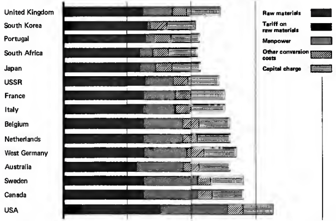
The major difference between these costs and those of the worsted fabric are the somewhat greater importance of the capital charge compared with cost of manpower. Figure 7.5(a) however, shows that internationally the same pattern applies, i.e. four very cheap producers with a considerable cost advantage over most European and other competitors.

In Table 7.11, which shows the familiar pattern of international trade on a competitive profitability basis, it can be seen that the competitive cost advantage of the leading producers is much smaller in terms of their capital charge than in the case of a worsted fabric: thus, in the Common Market, South Korean producers could increase their level of capital recovery by only 8 or 9 per cent in competition with local producers; similarly British producers could achieve a capital charge somewhat greater than 50 per cent in competition with the same local production. As in the case of the worsted cloth, the high tariff barriers around Portugal, Japan and South Africa demonstrate clearly the high level of protection given to local industries. In general, it would appear that international trade in woollen fabrics would tend to be rather more competitive than that in worsted fabrics, but that British producers would be at less of a disadvantage than British worsted manufacturers. Once again the most favourable markets are those within EFTA, but clearly no European market need be regarded as being completely unfavourable.

*Knitted fabrics*
International competitiveness in knitted fabrics, which may well form an increasing part of the British wool textile industry's activities, are studied in exactly the same way as the other



(a) A fancy woollen cloth, 13 oz per square yard



(b) A double-jersey knitted fabric, 7·4 oz per square yard

FIGURE 7.5 – OVERSEAS PRODUCTION COSTS FOR FABRICS

**Table 7.11 – International competitiveness in a woollen woven fabric**

| | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Market* | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | South Africa | 144 | Portugal | 135 | United Kingdom | **100** | South Korea | 86 | Japan | 67 | 3rd | **100** |
| Austria | Portugal | 141 | United Kingdom | **100** | South Korea | 50 | South Africa | 44 | Sweden | 31 | 2nd | **100** |
| Portugal | Portugal | **100** | United Kingdom | –228 | Sweden | –268 | South Korea | –445 | South Africa | –445 | 2nd | –228 |
| Sweden | Portugal | 142 | United Kingdom | **100** | South Korea | 99 | South Africa | 94 | Japan | 79 | 2nd | **100** |
| Belgium | South Korea | 109 | South Africa | 104 | France | **100** | Italy | **100** | Portugal | 98 | 10th | 57 |
| France | South Korea | 109 | South Africa | 104 | Italy | **100** | France | **100** | Portugal | 98 | 10th | 55 |
| Germany | South Korea | 108 | South Africa | 103 | France | **100** | Italy | **100** | Portugal | 97 | 10th | 51 |
| Italy | South Korea | 109 | South Africa | 102 | Italy | **100** | Portugal | 96 | Portugal | 95 | 10th | 51 |
| Netherlands | South Korea | 110 | South Africa | 105 | France | 101 | Italy | **100** | Portugal | **100** | 10th | 54 |
| USSR | South Korea | 111 | South Africa | 106 | Portugal | **100** | Japan | 91 | United Kingdom | 59 | 5th | 59 |
| Hong Kong | South Korea | 120 | South Africa | 101 | Japan | **100** | Portugal | 86 | United Kingdom | 40 | 5th | 40 |
| Japan | Japan | **100** | South Korea | –104 | South Africa | –120 | Portugal | –140 | United Kingdom | –186 | 5th | –186 |
| South Korea | South Korea | **100** | Japan | –100 | South Africa | –104 | Portugal | –123 | United Kingdom | –168 | 5th | –168 |
| Kenya | South Korea | 120 | South Africa | 115 | Japan | **100** | Portugal | 99 | United Kingdom | 53 | 5th | 53 |
| Canada | Canada | 108 | South Africa | **100** | South Korea | 78 | Portugal | 66 | Japan | 60 | 6th | 50 |
| USA | USA | **100** | South Korea | 19 | South Africa | 14 | Portugal | 5 | Japan | 3 | 6th | –38 |
| Australia | Australia | **100** | South Korea | –24 | South Africa | –34 | Japan | –40 | Portugal | –54 | 6th | –56 |

products. The United Kingdom production costs of a typical knitted fabric are shown below, revealing a pattern of costs very similar to that of the worsted cloth discussed above.

*UK knitted fabric production costs (pence per lb)*

| | |
|---|---|
| Raw materials | 126·6 |
| Labour | 39·8 |
| Staff | 5·2 |
| Consumables | 7·4 |
| Maintenance materials | 5·7 |
| Electricity | 3·8 |
| Steam | 1·3 |
| Other overheads | 4·3 |
| Stockholding | 1·8 |
| Capital charge | 44·8 |
| TOTAL | 240·7 |

The pattern of international trade also, shown in Table 7.12, is similar to that of the worsted fabric, with the United Kingdom again being well favoured within EFTA but able to achieve only rather low returns on capital in other countries. Nevertheless, once again the available return in the Common Market in competition with local producers is by no means negligible, although the cost advantage in these markets of South Korea compared with local producers is about 25 per cent of the South Korean normal level of capital charge. As in the case of the other fabrics, competition between the four low-cost producers would tend to be rather intense, these producers having a fairly large advantage over other producers from Europe and other industrialised countries.

### 7.7 Consequences of joining the Common Market

It will be recalled that throughout this chapter it has been assumed that the United Kingdom remains a member of EFTA but outside the European Economic Community. Inasmuch as it is the committed policy of the present British Government to seek entry into the European Economic Community at the earliest possible date, and that this same view will be held by any succeeding Government, it is important that the consequences of such a step for the United Kingdom wool textile industry should be understood. To study the effects of the move, an exercise similar to those undertaken in the previous three articles can be adopted to ascertain what would be the competitiveness of the United Kingdom compared with its major trading rivals were it to be a member of the European Economic Community. The product selected for detailed study is that used in Article 7.3, namely the representative worsted cloth. It is assumed that the United Kingdom on entry would enjoy the same tariff preferences as the present members of the Community, i.e. a common external tariff and duty-free trade between Community members. It is further assumed that existing members of EFTA would receive the same treatment but that the structure of Commonwealth preference would be discontinued. The effect, therefore, should be the widening of markets within Europe, but to diminish further the already relatively slight attractiveness of markets within the Commonwealth, where the United Kingdom, as pointed out earlier, gains only partial tariff preference.

Table 7.13 presents the results of the calculation showing international competitiveness in a few selected markets. It can be seen that a common pattern of competitiveness obtains throughout the members of the enlarged European Economic Community: that is, that Portugal, the United Kingdom and the lowest-cost Common Market producer are three of the five most favoured cloth producers, but that South Korea and South Africa have low enough production costs to be able to compete on fairly equal terms with the United Kingdom despite the tariff barrier. In the two Commonwealth countries selected for study,

Table 7.12 – International competitiveness in a double-jersey fabric

| *Market* | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | South Africa | 158 | Portugal | 157 | United Kingdom | **100** | South Korea | 79 | Japan | 63 | **3rd** | **100** |
| Austria | Portugal | 157 | United Kingdom | **100** | South Korea | 68 | South Africa | 63 | Japan | 50 | **2nd** | **100** |
| Portugal | Portugal | **100** | United Kingdom | −194 | Sweden | −254 | South Korea | −363 | South Africa | −364 | **2nd** | **−194** |
| Sweden | Portugal | 159 | United Kingdom | **100** | South Korea | 96 | South Africa | 91 | Japan | 78 | **2nd** | **100** |
| Belgium | South Korea | 126 | South Africa | 122 | Portugal | 120 | Japan | 106 | France | **100** | **10th** | 63 |
| France | South Korea | 125 | South Africa | 122 | Portugal | 120 | Japan | 106 | France | **100** | **10th** | 63 |
| Germany | South Korea | 125 | South Africa | 122 | Portugal | 120 | Japan | 106 | France | **100** | **10th** | 62 |
| Italy | South Korea | 123 | South Africa | 116 | Portugal | 114 | Japan | 102 | Italy | **100** | **10th** | 53 |
| Netherlands | South Korea | 126 | South Africa | 122 | Portugal | 120 | Japan | 107 | France | **100** | **10th** | 63 |
| USSR | South Korea | 106 | South Africa | 103 | Portugal | **100** | Japan | 87 | United Kingdom | 43 | **5th** | 43 |
| Hong Kong | South Korea | 119 | South Africa | 105 | Japan | **100** | Portugal | 95 | United Kingdom | 35 | **5th** | 35 |
| Kenya | South Korea | 119 | South Africa | 116 | Portugal | 105 | Japan | **100** | United Kingdom | 45 | **5th** | 45 |
| Japan | Japan | **100** | South Korea | 52 | South Africa | 36 | Portugal | 26 | United Kingdom | −35 | **5th** | −35 |
| South Korea | South Korea | **100** | South Africa | −146 | Japan | −147 | Portugal | −160 | United Kingdom | −218 | **5th** | −218 |
| Canada | South Korea | 123 | South Africa | 118 | Portugal | 114 | Canada | **100** | Japan | **100** | **6th** | 80 |
| USA | South Korea | 122 | South Africa | 116 | Portugal | 112 | Japan | **100** | USA | 65 | **6th** | 42 |
| Australia | Australia | **100** | South Korea | 81 | South Africa | 73 | Japan | 63 | Portugal | 60 | **6th** | 37 |

Table 7.13 – Competitiveness in worsted fabric with United Kingdom in EEC

| *Market* | *Producers' comparative profitability indices* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1st* | | *2nd* | | *3rd* | | *4th* | | *5th* | | *United Kingdom* | |
| United Kingdom | Portugal | 164 | South Korea | 103 | United Kingdom | 100 | South Africa | 88 | France | 73 | 3rd | 100 |
| Sweden | Portugal | 165 | South Korea | 103 | United Kingdom | 100 | South Africa | 89 | France | 74 | 3rd | 100 |
| Belgium | Portugal | 168 | South Korea | 103 | United Kingdom | 100 | South Africa | 89 | France | 74 | 3rd | 100 |
| Germany | Portugal | 166 | South Korea | 103 | United Kingdom | 100 | South Africa | 89 | France | 74 | 3rd | 100 |
| Italy | Portugal | 171 | South Korea | 103 | United Kingdom | 100 | South Africa | 91 | Italy | 75 | 3rd | 100 |
| Canada | South Africa | 140 | South Korea | 128 | Portugal | 117 | Japan | 100 | Canada | 100 | 6th | 6 |
| Australia | Australia | 100 | South Korea | 56 | South Africa | 41 | Portugal | 35 | Japan | 30 | 6th | –30 |

the United Kingdom remains sixth in order of preference, but at a considerably reduced level of potential profitability compared with Japanese producers.

Similar patterns can be observed for each of the representative products previously studied. In trade in tops, the very low cost products of South Africa and, occasionally, Japan can surmount the common external tariff and obtain abnormally high profits in competition with Portugal, the United Kingdom and Italy. In trade in worsted yarns, South Korea could also achieve these high comparative levels of profitability, the United Kingdom again having a more favourable position throughout Europe than existing Common Market members. In trade in woollen yarns and woollen fabrics, United Kingdom producers would be better able to compete with very low cost producers, and would again have a distinct advantage over France, Italy or other members of the existing Community.

To summarise, therefore, membership of an enlarged European Economic Community would considerably enlarge the markets potentially available to the United Kingdom in reasonable competition with the very low cost producers identified throughout this chapter. Were Portugal to remain outside such an enlarged Community, the competitiveness of the United Kingdom would, of course, be enhanced. Since British competitiveness in Canada and Australia has been shown throughout this chapter to be low by virtue of the comparatively insignificant tariff preference, the further loss of competitiveness in these markets is unlikely to have a serious effect on the industry's export prospects. It would, therefore, appear to be in the interests of the United Kingdom wool textile industry that the country should join an enlarged European Economic Community at the earliest possible date.

# Chapter 8 Future sales of the United Kingdom industry

### 8.1 Present patterns of international trade

Before the future sales levels of the UK industry can be determined, it is necessary to derive estimates of the future export opportunities open to the industry, and also to take into account any opportunities in the UK market which may be taken up by foreign industries. Two basic sources are available to assist in these assessments; the first is the study of international cost competitiveness described in Chapter 7, and the second is the present pattern of international trade. Where these two sources appear to differ, explanations must be sought in non-economic terms, and this topic of reconciliation is dealt with in Article 8.2.

*International trade in tops*

Present output of tops in the main producing countries totals some 1,800 m lb, of which 400 m lb are man-made fibre and 1,400 m lb wool and hair; of this 1,400 m lb, about 250 m lb enter world trade. Figure 8.1 (a) illustrates recent trends in exports and imports of tops.

The most significant features displayed on the figure are, of course, the decline of UK exports and the rise of EEC imports. The halving of UK exports has been largely compensated by the increasing exports of Japan, Uruguay, Australia and South Africa, which have caused total world trade to remain constant. The fall in UK exports has been caused by China, India and Egypt expanding domestic production and heavily restricting imports, by EEC producers becoming more competitive as their internal tariffs were reduced, by disguised Government subsidies given to Australian and Uruguayan producers, and by the trend towards dry-spinning taking place in many countries. The main UK export markets are currently Canada, Greece, Japan and EFTA.

Imports of wool and hair tops into the United Kingdom have been roughly constant at 2 m lb per year over the past ten years, with South Africa providing about 80 per cent of this. In the field of man-made fibre tops, the United Kingdom imports about 8 m lb per year (mainly acrylic) and exports 11 m lb from a total production of some 71 m lb.

*International trade in worsted yarns*

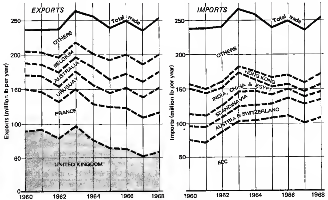
World production of yarns spun on the worsted system is presently about 1,600 m lb per year, of which 150 m lb are exported, as shown on Figure 8.1(b). France and Belgium provide over half the world exports, with West Germany being by far the largest importer. Thus there are two major components of world trade—the bulk inter-EEC movements of dry spun yarns, and the export of small quantities of speciality yarns by other producers.

United Kingdom exports have fallen from 19 to 14 m lb between 1960 and 1968; only Belgian and Japanese exports have increased during this period, and not very substantially at that. The major cause of the decrease in UK exports is the loss of a substantial share of the German market to France and Belgium. Presently, the largest importers of UK worsted yarns are Canada, West Germany and Ireland.

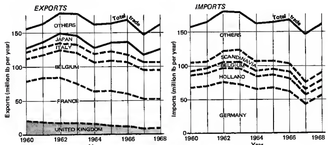
UK imports are currently 3 m lb per year (mainly from France and Ireland), of which about 1 m lb are weaving yarns.

*International trade in woollen yarns*

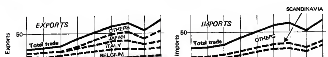
Compared with world production of 2,000 m lb of woollen yarns, international trade is insignificant, at about 60 m lb per year. An approximately equal proportion is provided by the United Kingdom, Belgium, Italy and Japan, all of whose exports have tended to rise in recent years. The United Kingdom increase is due mainly to exports to the Danish and Swedish carpet industries; Belgium and Italy have benefited from increasing EEC consumption, whilst Japan has made increasing deliveries of woollen hosiery yarns to Hong Kong.



(a) Tops



(b) Worsted yarns



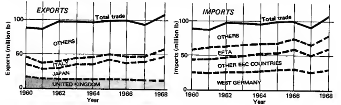
(c) Woollen yarns

FIGURE 8.1 – INTERNATIONAL TRADE IN TOPS AND YARNS

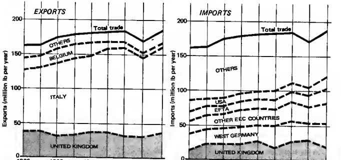
Only the EEC countries are significant as importers; apart from their 20 m lb per year, the remainder of world imports are taken in small quantities by a large number of countries. United Kingdom imports have been fairly steady at about 1 m lb per year for the past five years, although there has been some tendency to fall.

*International trade in worsted woven fabrics*

World trade in worsted fabrics, shown in Figure 8.2(a), has been about 100 m lb per year, of which the United Kingdom accounts for 19 m lb at present, having been roughly constant since 1960. During this period, only Japan has shown a significant rise in exports (from about 14 m to 25 m lb per year), largely to Canada and the USA.



(a) Worsted woven cloth



(b) Woollen woven cloth

FIGURE 8.2 – INTERNATIONAL TRADE IN WOVEN FABRICS

On the imports side, the EEC countries absorb over half the world total, with EFTA importing only about a quarter as much as the EEC. The United Kingdom imports about 1 m lb per year, and although small, imports have grown consistently since 1955.

*International trade in woollen woven fabrics*

Trade in woollen fabrics amounts to some 180 m lb per year, of which the United Kingdom accounts for 29 m lb at present. As in the case of worsted cloth, exports have declined very slowly in the past, but in the woollen field it is Italy, rather than Japan, which has significantly increased its exports. Indeed, Italy now supplies over 60 per cent of total world exports of woollen fabrics, and has eroded Belgian exports in addition to British. Figure 8.2(b) shows recent trends in exports and imports.

United Kingdom imports of woollen fabrics have approximately doubled since 1960, the competitiveness in price and design of Italian fabrics (mainly from the Prato industry) being a major cause. Imports from Italy have tended to level out in the last two years.

*International trade in blankets*
Total production of principal producing countries is currently about 115 m lb per year, compared with 1,300 m lb of woven fabrics. United Kingdom production is about 10 m lb per year, of which exports are about 2 m lb per year. Imports, mainly from the Continent, have been around 10 m lb per year.

## 8.2 International trade and competitiveness

A comparison of the present patterns of international trade in wool textile products as given in the previous article with the calculated pattern of competitiveness discussed in Chapter 7 (when it was assumed that every country would be operating under optimum conditions and producing identical products) reveals several major differences. For example, some conclusions of Chapter 7 would be that there would be little wool textile production in North America or some of the Common Market countries; that there would be far greater trade in wool textile products than in fact occurs; that exports from South Korea, South Africa and similar countries would be much greater than they in fact are, and that Italian producers would have a smaller share of trade outside the Common Market than they presently obtain. On the other hand, Chapter 7 indicates that tops from Australia could be expected to be as popular as they are, that the United Kingdom could not really expect to compete in the Common Market in standard wool textile products, and that with few economic incentives to trade in woollen yarn, this would be a product which would tend to be largely produced by domestic industries.

There are a number of reasons why there should be differences between the conclusions of Chapter 7 and the present patterns of trade. Firstly, the calculations in Chapter 7 were intentionally based on factors as they should occur in the 1970's rather than as they did occur in 1967, which was the last year for which full detailed facts about international trade were available. Secondly, it is most unlikely that the assumption that every producing country should be operating on optimum conditions is currently valid, or indeed is likely to be valid in the foreseeable future. Thirdly, as stated in Article 7.1, the production of all the representative products was examined for each country, even where there is currently no production of some of these items whatsoever. A fourth point which should be repeated is that one potential source of inaccuracy in the calculations in Chapter 7 was the lack of reasonably comparable data on international productivity differences. To the extent therefore that South Korean labourers, for example, are inherently less productive per man than British workers, so the comparative advantage of South Korean producers would tend to be overstated. Nevertheless, as shown throughout Chapter 7, considerable changes would have to be made in most cases to the international manpower cost index to invalidate the basic conclusions of the chapter; and variations in machine productivity having been eliminated, it is only variations in human abilities which could change the conclusions.

There are several particular aspects of international trade which are worthy of comment inasmuch as they appear to contradict completely the findings of Chapter 7. The fact that the United Kingdom exports fabric to Japan should be seen not as an economic anomaly, but as the supply of an insignificant share of total Japanese consumption of woven cloth which occurs as a result of an aspect of their system of pricing and the extremely high reputation of British cloths. The large volume of exports of woollen fabrics from Italy appears to be contrary to the economic calculations, but in fact results mainly from the use of low-paid, self-employed labour in the Prato area, and intense specialisation in low-price production from waste, whereas the calculations were based on orthodox Italian employment conditions such as those obtaining in the Biella area where much of the Italian wool textile industry exists. Another aspect of current international trade is that the wool textile industries in South Korea, South Africa and Portugal are currently much less-developed than would be necessary for them to dominate international trade, as suggested by Chapter 7.

Another major point which highlights a discrepancy between the two sets of figures is that the worsted industries in the Common Market, EFTA and even Hong Kong are based on dry spinning, which tends to militate against producers in the United Kingdom or Australia, who are mainly equipped for the production of oil spun yarns and Noble combed tops.

In the remainder of this article will be discussed several other basic reasons why the achieved pattern of international trade can be expected to differ from that which might be predicted from Chapter 7.

*Production techniques*
The assumption in Chapter 7 that each producing country should be operating according to the optimum United Kingdom practice clearly bears little resemblance to reality. Particular examples of differences under this heading are the fact that the Japanese industry has a considerable stock of non-automatic looms, that much of the Portuguese industry is equipped with obsolescent and inefficient plant, and, as mentioned above, that the Italian woollen industry in Prato is based on a completely different technique of production, and relies largely on recovered wastes rather than on new wool as its raw material.

*Development of overseas industries*
Allied to the points discussed above is the fact that several countries identified as being major competitors are, in fact, still only small producers of wool textile goods. For example, the South African industry, shown throughout Chapter 7 to be a dominant feature of international trade, is, in fact, currently capable of exporting large quantities of tops, but is less able to export yarns and fabrics. Similarly, in Portugal there is currently little capacity for the production of tops or yarns for export, while the whole South Korean industry is little more than embryonic.

*Quality and design*
It was shown in Chapter 7 that in many markets the British industry could not hope to compete in standard wool textile products. However, in many of these markets British exporters justifiably take great advantage of their design knowledge and reputation for high quality to provide for specialist and less price-conscious requirements. On the other hand, throughout Europe it is apparent that there are areas of the market where British cloths could be more competitive if their designs were more immediately fashion-conscious. Similarly, in the American market, Japanese manufacturers, by copying directly American designs, are able to obtain an advantage over British competitors in addition to their inherent but comparatively small cost advantage.

*Dual pricing*
Until 1961, Japanese exporters of wool textile products were encouraged by their government to operate completely different pricing systems in their home and export markets, in order to obtain rights to import raw materials. Although this practice has been officially abolished, it is believed that it still in fact persists, and is indeed only an example of systems of dual pricing operated by several of the United Kingdom industry's major competitors. It should be stressed, however, that there is nothing intrinsically wrong in dual pricing, which is practised in a wide variety of industries both in the United Kingdom and overseas. It is this system to a large extent which provides British manufacturers with the opportunity of exporting fabric into the highly-priced Japanese home market. Nevertheless, it does provide

a possible explanation for cases where the British industry appears to have less of a competitive edge in export markets than Chapter 7 would suggest.

*Import tariffs*
The levels of import duties assumed in Chapter 7 are in certain circumstances somewhat different from those currently in operation, although there are few countries which are to reduce their tariffs on wool textile products as a result of the Kennedy Round. In particular, the EFTA preference given by Portugal is currently somewhat less than that assumed in Chapter 7; certain of the Canadian tariffs are subject to reduction over the next few years; and obviously the assumption of a common external tariff for the Common Market, which was introduced on July 1st, 1968, is considerably different from the tariffs in operation when the figures in Article 8.1 were recorded.

*Marketing techniques*
It has been shown throughout the study that the British wool textile industry is able to take advantage in many export markets of its reputation and the high-quality image of British goods. However, these advantages may well become increasingly less significant as other countries increase their experience and knowhow. It is clear that one area where the cost competitiveness of the British industry is distorted is in its inability to meet the delivery requirements of many importers, particularly those on the Continent. Apparently it is common for French or even German producers to obtain orders in competition with British exporters purely because they are able to offer and maintain much shorter delivery dates than the United Kingdom producers. Other marketing aspects which similarly tend to distort the pattern of cost competitiveness are the relative inability of British manufacturers to offer sample lengths of cloth, and a tendency for British producers to ignore the differences in units of measurement between the United Kingdom and most overseas markets. Although these appear to be comparatively minor points, it should be observed that in most markets in Europe the cost advantage of the United Kingdom industry over other European producers is quite small, and slight marketing differences could easily overcome these.

### 8.3 Government policies in relation to trade

It has been shown in Chapter 7 that United Kingdom producers are bound to be at a serious cost disadvantage in most markets when competing with producers in the newer wool textile-producing countries such as South Korea, Japan, Portugal and South Africa, and it should be realised that these countries are themselves only representative of a larger number of similar producers, such as Spain, India, Taiwan, Egypt and so on. In the home market, the disadvantage can to some extent be reduced by the imposition of import duties, but in export markets there are no countries where United Kingdom producers obtain sufficient tariff preference to give them a clear trading advantage against all such low-cost competitors. In the major European Economic Community and United States markets, British producers compete on equal terms with these low-cost producers against local production enjoying the protection of tariff barriers, which further reduces the competitiveness of the British industry. Within EFTA the United Kingdom enjoys similar advantages to those obtained within its home market, but is still vulnerable to this very low-cost competition, particularly since Portugal also enjoys EFTA preference.

It was shown in the analysis of each representative product in Chapter 7 that in general there is no conceivable improvement either in the cost of capital, cost of manpower, or tariff protection which could improve the competitiveness of United Kingdom producers relative to those in the low-cost countries. It would, however, be of not inconsiderable benefit if the ability of the British industry to compete with other European industries could be improved, since competition with the new countries is often decided on factors other than purely economic ones, whereas competition with, say, Belgian products would tend more often to be a straight economic choice.

There are four areas in which it is envisaged that Government policies could affect the competing power of the British industry, namely corporate taxation, private expenditure taxation, international trade regulations, and membership of international trade groups; each is discussed in turn below.

*Corporate taxation*
It was shown in Chapter 7 that the United Kingdom producers already enjoy a lower cost of capital than most competing producers because of generous depreciation allowances given on capital expenditure, because of cash grants given to offset investment in plant, and because of a rate of Corporation Tax which is by no means the highest in the world. It must be appreciated, however, that for a well-established industry with a considerable heritage of buildings and plant, the value of the capital expenditure incentives in the form of depreciation allowances and cash grants is considerably diminished. Any reduction, therefore, in rate of Corporation Tax would be of direct advantage to the industry's export prospects. Inasmuch as it is probable, however, that the future development of the industry will require renewed capital investment, the existing incentives should be taken advantage of by the industry, and there is a good case for suggesting that, in view of the industry's export performance, with over a third of its output being exported, quasi-Development Area status should be given to the industry as a whole to encourage further export-directed investment. This point is referred to in greater length in Article 17.3 in discussing the future investment proposals for the industry.

*Private expenditure taxation*
Inasmuch as most taxation or regulations affecting private expenditure (such as purchase tax and hire purchase regulations) apply equally to imported goods and to UK production, it is felt that little need be done in these areas to increase the relative trading ability of the British wool textile industry. However, the replacement of purchase tax by a value added tax has received considerable attention, particularly in order to bring the British fiscal system further in line with those of the Common Market countries. Value added tax (VAT) is a method of taxing final consumer expenditure in the domestic economy. Inasmuch as it is levied on imports as well as on domestic production, it would not increase the British industry's domestic competitiveness, but because VAT is a tax on domestic consumer expenditure it is refunded to any exporter of goods which have previously incurred payment of VAT. This can be, therefore, a form of export incentive, and as such is one of the main arguments in favour of the introduction of VAT into the United Kingdom fiscal system. This export incentive disappears if home prices and wages rise by the same proportion as the rate of VAT, but it would be hoped that such rises could be prevented by legislation. The possible substitution of part of Corporation Tax by VAT would also be detrimental for firms exporting at less than full profit margins, since the inability, under a VAT system, to offset tax liability on home sales against export losses would result in a partial shifting of the aggregate tax burden onto exporting companies. The argument that VAT discriminates against the less efficient companies–that is, those whose ratio of profits to value added is low–favours the introduction of VAT to assist in the removal of 'dead wood' from the industry. It should be realised, however, that there are great administrative problems in connection with VAT, and that no conclusive argument can really take place until a precisely-formulated proposal concerning the tax has been made. Nevertheless, on balance, it is probable that a flat-rate VAT system, collected by means of the sales invoice procedure, would be in the interests of the British wool textile industry.

*International trade regulations*
Careful consideration has been given to the major problems of tariffs and other regulations governing international trade. Certain conclusions have been drawn, but rather than include them in the published report they have been presented, together with detailed supporting

arguments, to the Steering Group of the EDC. In this way Government has the maximum opportunity for success in any negotiations which may follow these recommendations.

*Membership of international trading groups*
As already discussed in Article 7.7, it would be in the interests of the British wool textile industry for the United Kingdom to join the European Economic Community in concert with most of the other members of EFTA. In view of the relative populations of EFTA and the EEC, the unilateral entry of the United Kingdom into the Common Market, with the loss of any trading privileges with other EFTA members, would still on balance be an advantage to the industry, since it would retain a considerable competitive advantage over France, Italy and so on, both within and without the common external tariff. If, however, British entry into the Common Market is not possible even in the medium term, then membership of a North Atlantic free-trade area containing at least the USA, Canada and the United Kingdom would open up further markets much larger than those of EFTA. The industry should, therefore, assess the likelihood of the country joining the European Economic Community and advocate moves towards a North Atlantic free-trade area if no progress can be foreseen into the European Economic Community.

## 8.4 Export opportunities for the United Kingdom

The earlier articles of this chapter have dealt with current trends in the pattern of international trade, differences between this pattern and that which might be expected from the study of cost competitiveness in Chapter 7, and effects of possible Government action. Later chapters will consider changes in production and marketing procedures which may also affect export performance. In the light of all these considerations, it is now possible to arrive at a forecast of the level of export sales in the future.

Since to a large extent export sales will depend on the policies adopted by the industry in various fields, the figures given represent rather more than the results of an entirely passive market forecasting exercise. In fact, they constitute recommendations to the industry of appropriate export targets which can be achieved at reasonable prices and which will hence maximise the industry's profitability.

*Exports of tops*
Apart from the United Kingdom, the six main exporters of tops at the moment are France, Belgium, Australia, Japan, South Africa and Uruguay. The study of cost competitiveness discussed in Chapter 7 suggests that the last four of these will be most favourably placed in the future.

The conclusions in Chapter 7 imply that on an ex-works basis, Australian topmakers have a 4 per cent advantage over those in the United Kingdom. This advantage is slightly increased by known subsidies granted to Australian producers. Australian exports to Northern Europe are likely to remain small because of long delivery times and problems of communication. Further Australian gains in the Canadian and Greek markets are likely to be limited by the capacity of the Australian combing industry, which will soon require new investment if exports are to be significantly increased.

The costs calculated for Japan in Chapter 7 are likely to be rather lower than those achieved in practice, mainly because of above-average indirect labour costs. Japan faces the same problems as Australia in Northern Europe, and does not receive the same Commonwealth Preference from Canada. The South African industry is likely to suffer from low productivity and shortage of suitable labour. Current exports from South Africa are mainly in high-quality tops based on domestic wool. Cost competitiveness calculations cannot be expected to indicate the export performance of Uruguay with any accuracy, because of the rapidly changing pattern of export taxes and subsidies which are imposed. The limited production of tops is currently based entirely on domestic wool.

Chapter 7 suggests that French and Belgian producers will be at a slight disadvantage when compared with the United Kingdom. In fact, the effects of the value added tax operating in these countries gives them a slight advantage in exporting, so that in practice little cost difference will exist.

Apart from the competitive position of the various exporters, the future level of United Kingdom exports will depend on the development of the important export markets. The United Kingdom's biggest market at the moment is Canada, where domestic production is likely to remain negligible. Between 1961 and 1967, Canadian imports increased from 12 to 14 m lb and may be expected to rise further to about 20 m lb in the mid-1970's. The United Kingdom share of this market, however, is likely to continue to fall because of increasing competition from Australia. The Greek market has also been rising, and this trend is likely to continue. Again, however, increasing competition, partly from Australia and Uruguay, and partly from EEC countries because of the trend to demand for French combed tops, is likely to reduce the United Kingdom share of the market.

United Kingdom exports to Scandinavian countries have been falling, mainly because of a movement towards the use of dry spinning equipment. The same influence has been felt in Australian and Swiss markets, to which United Kingdom exports have been static in spite of an increase in total imports. Exports to EEC countries have fallen sharply. Estimates for the mid-1970's, together with the most recent comparable figures, are given below in million lb per year:

| | *Present imports* | *Supplied by the UK* | *UK supplies in mid-1970's* |
|---|---|---|---|
| Canada | 14 | 12 | 10 |
| Greece | 12 | 5 | 4 |
| Scandinavia | 14 | 10 | 7 |
| Austria and Switzerland | 26 | 2 | 2 |
| EEC | 98 | 3 | 3 |
| Others | 67 | 19 | 19 |
| TOTALS | 231 | 51 | 45 |

Trade in man-made fibre tops is difficult to forecast, mainly because of its dependence on the installation of tow conversion facilities in export markets, and the relative duties imposed on staple fibre, tow and tops. United Kingdom exports have been growing rapidly, but rather slower growth is foreseen because of the installation of conversion equipment in Communist countries which represent the most important market. It is estimated that exports of man-made fibre tops will grow from the current figure of 11 m lb to about 15 m lb in the mid-1970's.

*Exports of worsted yarns*

The calculations of Chapter 7 suggest that the greatest threats to traditional exports of worsted yarns will come from South Africa, Portugal, Korea and Japan. As in the case of tops, it is unlikely that the low costs anticipated in South Africa will be achieved in practice. Japan and Korea both incur high indirect labour costs, and in any case have no cost advantage over the cheapest producers in both EEC and EFTA. This is important, since these two trading groups account for about 70 per cent of total world imports. Japanese and Korean exports are also subject to the disadvantages of distance from the market and long delivery times. Within EFTA, Portugal is a possible threat but its exports are negligible at present.

In practice, the main competition to United Kingdom exports is likely to come from France and Belgium. These countries are at the moment able to offer yarns about 5 per cent below the United Kingdom prices. This is partly because their spinners tend to specialise in the production of a few counts to a much greater extent than their British counterparts, and are thus able to achieve the economies of long runs. Further factors are the existence of a high rate of value added tax and intense competition in domestic markets. United Kingdom exports to EEC fell sharply with the loss of the 'Hartes Kammgarn' trade in Germany, while sales to EFTA markets have remained stable. At the moment, development of these markets is limited by their requirement for dry spun yarns and by the relatively long delivery periods offered by United Kingdom spinners. Production and marketing proposals recommended in other parts of this report will help to overcome these problems so that some increase in sales to European markets may be expected.

The United Kingdom is likely to maintain its present dominance of markets in Canada and Ireland, which mainly require oil spun yarns. Exports of hand knitting yarns, which are sold in small quantities to a wide range of markets, are expected to remain at about their present level of 5 m lb. Thus an increase in total exports of worsted yarn from 14 to 18 m lb is forecast.

*Exports of woollen yarns*

Chapter 7 suggests that the lowest-cost producers of woollen yarns in the future are likely to be Japan, Korea, South Africa and Portugal. The production of the last three of these is currently limited by their capacity, and they are not exporters. Japan is not competitive in EFTA and barely so in EEC. These two groups together account for about 60 per cent of total world imports.

United Kingdom exports of woollen yarns largely consist of carpet yarns, which are sold to a number of overseas markets, notably Denmark and Sweden. These markets are growing rapidly, and assuming that the United Kingdom retains her position in EFTA, it is reasonable to assume a doubling of sales to Scandinavian markets by the mid-1970's. This represents an increase in total exports from the current level of 13 m lb to 18 m lb in 1975.

*Exports of worsted woven fabrics*

The countries which emerged as lowest-cost producers from Chapter 7 are Japan, Korea, Portugal and South Africa. At the moment, production in Japan and Korea is largely confined to fine, lightweight fabrics, and exports—particularly from Japan—are assisted by the practice of dual pricing referred to in Article 8.2. Further erosion of United Kingdom markets may be expected in this sector.

For heavier weights of fabric, Portugal is likely to emerge as an important exporter, particularly in EFTA markets. Portugal's exports sales are small at the moment, but rising rapidly.

United Kingdom markets in North America are expected to decline further, but at a lower rate than in the past, as the exclusive market for very-high-quality suitings is likely to be maintained. Sales to EFTA and EEC markets are assumed stable, but further decline is forecast in sales to South Africa, Australia and New Zealand, mainly because of increased competition from Japan and Korea.

The markets which have grown most rapidly in recent years are Japan and Hong Kong, whose economic growth is placing the purchase of British cloth within the reach of a higher and higher proportion of the population. This trend is expected to continue. Forecasts of export sales in millions of square yards are summarised overleaf, the total export sales in the mid-1970's being equivalent to a fabric weight of 19 m lb.

| | *Present UK exports* | *Mid-1970's UK exports* |
|---|---|---|
| North America | 5·5 | 5 |
| EEC | 3·5 | 3·5 |
| EFTA | 4·5 | 4·5 |
| Australia, New Zealand and South Africa | 2·5 | 2 |
| Hong Kong and Japan | 6·5 | 8 |
| Others | 10·5 | 9 |
| | 33·0 m sq yd | 32·0 m sq yd |

*Exports of woollen woven fabrics*
None of the four countries identified as low-cost producers in Chapter 7 (Japan, Korea, South Africa and Portugal) are significant exporters at the moment. In practice, the major low-cost exporter of woollen cloth is Italy. A number of complaints have recently been made, particularly by other members of EEC, about the excessive fiscal advantages apparently enjoyed by the Italian Prato industry. However, a recent study carried out by the European Commission revealed that discriminatory tax systems could only account for a 2 or 3 per cent difference in price, which is nowhere near the price difference actually achieved. Further reasons must be sought for this price difference, and these have been discussed earlier in Article 8.2.

The other important influence on prospects for exports of woollen fabric is the general decline in world markets. In particular, the market for coatings in North America has fallen sharply, and this trend is likely to continue. Other markets are falling because of the growth in popularity of jersey fabrics.

Further growth may be expected in sales to EFTA markets, but at a somewhat slower rate than in the past. Sales to EEC countries have been taken at their level in the recent past, ignoring the exceptionally low figure in 1967. United Kingdom exports of woollen fabric in millions of square yards are given below, together with estimates for 1975; the total weight of fabric in the mid-1970's will be about 33 m lb.

| | *Present UK exports* | *Mid-1970's UK exports* |
|---|---|---|
| North America | 10·9 | 9 |
| EEC | 7·8 | 12 |
| EFTA | 9·8 | 12 |
| Hong Kong and Japan | 5·0 | 5 |
| Australia, New Zealand and South Africa | 4·3 | 3 |
| Others | 9·2 | 9 |
| | 47·0 m sq yd | 50 m sq yd |

8.5 Competition in the home market
In the previous article, estimates were made of the opportunities for United Kingdom exporters of wool textile products in various markets of the world. It was shown that forecasts of exports were made with a view to maximising the profitability of the industry, and these were based, therefore, on the industry's comparative costs vis-à-vis its major competitors and on its ability where possible to charge a premium price for particular design or quality advantages. Similarly, within the home market the industry can expect to dominate sales only where its selling price is lower than those of any competitors, or where it can obtain a premium for design, quality or even for patriotic reasons. It is important, therefore, that some estimate be made of the likely impact of imported products in the mid-1970's, even though, as at the present time, these can be expected to form a very

small proportion of domestic consumption. A further share of home consumption of certain wool textile products is provided by British producers outside the industry, and this article therefore involves forecasting the likely levels of their production in future.

*Imports of tops*

As shown in Article 8.1, imports of natural fibre tops at the current time are about 2 m lb out of a total domestic consumption of 153 m lb, these imports mainly coming from South Africa. Chapter 7 showed that the British industry is vulnerable to imports of tops from South African and South American producers, to a certain extent from Australia, and from Portugal should an adequate combing industry be established there. It is estimated, therefore, that imports of natural fibre tops will increase to 12 m lb per year by the mid-seventies, out of the total home consumption of 142 m lb, with most of the increase in this estimate coming from South America and South Africa. Should the Portuguese industry be further developed, this figure could rise significantly.

Chapter 6 implies that domestic consumption of converted tops will increase from 68 m lb at present to 96 m lb by the mid-1970's. Currently, 24 per cent of this domestic consumption is provided by firms tied directly to man-made fibre producers, and it is considered probable that such companies will slightly increase their share of the total market by the mid-1970's.

A high proportion of current imports are of acrylic tops made by Dupont. In the future these will be supplied from a new plant in Northern Ireland, so that imports are likely to fall. Taking this in conjunction with the price advantage of United Kingdom fibre producers over potential importers, it is expected that imports of converted tops will decline from 8 m lb to around 3 m lb per year.

*Imports of worsted yarns*

Of the current home consumption of worsted yarns of 206 m lb, 16 m lb are spun outside the industry from the converted tops produced outside the industry; they are used directly by the hosiery industry. A further 3 m lb per year are imported, largely from Ireland and Austria. As in the case of converted tops, it is expected that the share of the market held by spinners outside the industry will be marginally increased, thereby accounting for 28 m lb per year out of 232 m lb per year home consumption in the mid-1970's. Similarly, it is expected that imports will marginally increase their contribution to domestic consumption, rising to about 5 m lb per year, much of the increase coming from South Africa and Portugal.

*Imports of woollen yarns*

It was shown in Article 8.1 that imported woollen yarns form a negligible proportion of annual home consumption, providing 1 m lb out of 284 m lb. In view of the comparative slight cost advantages in trading woollen yarns, and the high degree of design integration desirable in a fashion industry, it is not expected that this share will increase. Production of yarns by the carpet industry, currently slightly below 80 m lb, is expected to rise very slightly to 81 m lb.

*Imports of semi-worsted yarns*

Domestic consumption of semi-worsted yarn by the carpet industry is currently 39 m lb, of which 24 m lb are produced within the carpet industry itself. With the development of the carpet industry, it is expected that consumption of the yarns will rise to 93 m lb, the proportion of this provided by the carpet industry itself remaining constant. It is not anticipated that there will be significant international capacity for exports of semi-worsted yarn, in view of the large expansion of demand forecast for most developed countries.

*Imports of worsted woven fabrics*

Consumption of worsted cloth is currently 62 m lb, of which 1 m lb are imported mainly from Ireland and Italy. Although it is expected that consumption will only rise by 1 m lb by the mid-1970's, it is probable that imports will increase to 3 m lb in view of the striking cost advantage in this country of the Portuguese and South African industries, both of which can be expected to develop significantly over the next few years. It is also possible that imports from South Korea and Japan will begin to threaten the British industry by the mid-1970's.

*Imports of woollen woven fabrics*

The consumption of woollen cloth is currently 113 m lb, together with 18 m lb of woven blankets. Imports are 14 m lb and 10 m lb respectively, the major suppliers of both types of product being Ireland and Italy. Domestic consumption of these products is expected to decline by the mid-1970's to 105 m lb of fabrics and 10 m lb of blankets. Imports of cloth, it is estimated, will stay at the same level, thus slightly increasing their share of the market, although it is likely that Portugal will supply a slightly greater proportion of these imports. Imports of blankets are expected to fall to 8 m lb per year, which will represent a strikingly increased share of total consumption. Most of these imports will continue to come from the Common Market.

*Imports of knitted fabrics*

Since it has been assumed that only a small proportion of total UK consumption of knitted fabrics will be produced by the industry, the effect of possible imports and exports on the industry will be marginal, and has not been estimated quantitatively.

## 8.6 Future levels of United Kingdom production

Having taken views on the most likely levels of export and home sales in Articles 8.4 and 8.5 respectively, it is now possible to bring the two together to give total sales figures.

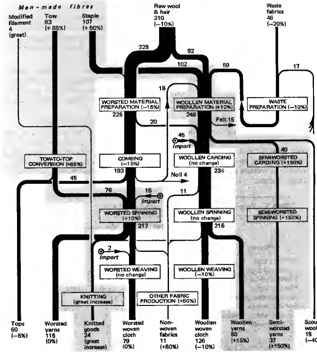
It is also necessary to know the quantities of man-made fibres in the industry's products; these are derived from Table 6.11, which considered only home consumption, and from estimates of the present breakdown of exports by fibre. Table 8.1 shows the resulting external sales and man-made fibre contents in the mid-1970's.

Table 8.1 – Proposed sales from the industry in the mid-1970's

| | *Sales outside industry (m lb per year)* | | | |
|---|---|---|---|---|
| *Product* | *At home* | *Exports* | *TOTAL* | *Man-made fibre content* |
| Combed tops | – | 45 | 45 | – |
| Converted tops | – | 15 | 15 | 15 |
| Worsted yarns | 98 | 18 | 116 | 54 |
| Woollen yarns | 62 | 18 | 80 | 33 |
| Semi-worsted yarns | 37 | – | 37 | 37 |
| Worsted woven fabrics | 60 | 19 | 79 | 20 |
| Woollen woven fabrics | 93 | 33 | 126 | 18 |
| Knitted goods | 24 | – | 24 | 10 |

Because of the arithmetical complexity involved, the bands of doubt derived in Article 6.9 will not be carried through this part of the argument; their significance will be assessed later in the article, in the discussion of the conclusions.

With this set of data, it is now possible to use the flow diagram of Figure 1.3 as a basic model of the industry, whereby the mid-1970's sales figures can be converted by arithmetic into consistent sectoral levels of output, and ultimately to quantities of raw materials which will be required; at each process stage, of course, process losses, imports and exports are taken into account. Figure 8.3 illustrates the resulting flow through the industry, which may be compared directly with the present flows shown in Figure 1.3. Where changes in output have occurred, they are expressed to the nearest 5 per cent on Figure 8.3.


Men-made fibres
Modified filament 4 (great)
Tow 93 (+ 65%)
Staple 107 (+ 50%)
Raw wool & hair 310 (–10%)
Waste fabrics 46 (–20%)
228
82
102
59
17
18
WORSTED MATERIAL PREPARATION (–15%)
WOOLLEN MATERIAL PREPARATION (+10%)
WASTE PREPARATION (–10%)
228
248
20
Felt 15
45
Import
40
TOW-TO-TOP CONVERSION (+65%)
COMBING (–15%)
WOOLLEN CARDING (no change)
SEMI-WORSTED CARDING (+150%)
193
234
Noil 4
45
76
15
Import
11
WORSTED SPINNING (+10%)
WOOLLEN SPINNING (no change)
SEMI-WORSTED SPINNING (+150%)
217
216
2
Import
WORSTED WEAVING (no change)
WOOLLEN WEAVING (–10%)
KNITTING (great increase)
OTHER FABRIC PRODUCTION (+50%)
Tops 60 (–5%)
Worsted yarns 115 (0%)
Knitted goods 24 (great increase)
Worsted woven cloth 79 (0%)
Non-woven fabrics 11 (+80%)
Woollen woven cloth 126 (–10%)
Woollen yarns 80 (+15%)
Semi-worsted yarns 37 (+150%)
Scoured wool 15 (–40%)

*The numbers represent flows in million lb per year*

*Percentages give changes from present flows to nearest 5*

*Expanding sectors shown in red*

FIGURE 8.3 – PROPOSED LEVELS OF PRODUCTION IN THE MID-1970's

The most immediate observation to be made is that all those sectors which use a high proportion of man-made fibres show a radical increase in output. A slowly-decreasing usage of wool, both raw and re-used, is foreseen, although wool will still form approximately 65 per cent of total fibre requirements in the mid-1970's. As a result of this decrease, the output of the combing sector is expected to fall by some 15 per cent, although worsted spinning will benefit from the increased throughput of man-made fibres. Most of the increased output of worsted yarns will be for knitting, so that output of worsted cloth is not expected to change significantly.

On the woollen system, the only notable change is a decrease in output of woven cloth, and increased sales of yarns to the carpet and knitwear industries. Output of semi-worsted yarns for carpets is expected to cover a large proportion of the forecast growth in carpet consumption.

Special mention should perhaps be made of the figure of 24 m lb adopted for the industry's future output of knitted goods, and that of 37 m lb for semi-worsted yarns. The first was derived from the assumption that the industry should be successful in capturing about 30 per cent of the forecast increase in UK consumption of knitted goods; the second assumes that the industry will supply the same proportion of carpet yarns as at present.

Although Figure 8.3 is derived largely from market forecasts, the figures for sectoral outputs are not solely passive forecasts of the likely course of events if no internal action is taken by the industry; they represent recommendations relating to desirable future levels of output, and will not be achieved without positive action by the industry in the fields of tow-to-top converting, semi-worsted processing, and knitting.

Having performed the calculations thus far on the basis of 'best estimate' consumption figures, it now remains to test whether the bands of doubt set down in Articles 6.9 and 6.10 are sufficiently narrow for the proposed sectoral levels of output to be confirmed with confidence. Table 8.2 shows present output levels, proposed future levels and the bands of doubt, from which it is seen that, although there is a fair spread, in no case is the direction of movement (i.e. increase or decrease in output) affected, except where 'no change' is the best estimate forecast.

Table 8.2 – Proposed production levels in the mid-1970's

| | *Output (m lb per year)* | | *Percentage change* | |
|---|---|---|---|---|
| *Product* | *At present* | *Mid-1970's* | *Proposed* | *Band of doubt* |
| Combed tops | 202 | 175 | –13 | –5 to –25 |
| Converted tops | 55 | 91 | +66 | +50 to +80 |
| Worsted yarns | 201 | 217 | +8 | +5 to +15 |
| Woollen yarns | 217 | 216 | 0 | –10 to +10 |
| Semi-worsted yarns | 15 | 37 | +146 | – |
| Worsted woven fabrics | 80 | 79 | –1 | –10 to +10 |
| Woollen woven fabrics | 138 | 126 | –10 | –5 to –15 |
| Knitted goods | 0 | 24 | great | – |

# Part Three Future of the industry's production

# Chapter 9 Production of tops

## 9.1 Processes for producing tops

This chapter is concerned with all processes between reception of raw materials and the production of finished tops. The basic processing systems for natural and man-made fibres are illustrated in Figure 9.1, although this cannot show all the possible combinations and re-cycling stages of backwashing, re-gilling, and so on, which are necessary for some qualities of raw wool and finished top. Figure 9.1 also contains our conclusions on how the flow of materials in top production should change by the mid-1970's, as a result of the implementation of the recommendations outlined in the body of the chapter in conjunction with the conclusions of Chapter 8 relating to demand and competitiveness in the markets at home and overseas.

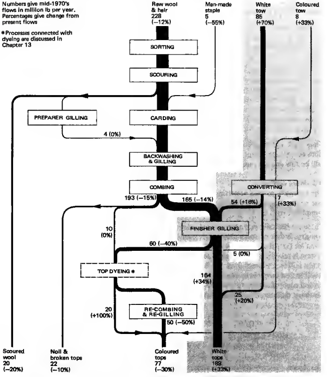


FIGURE 9.1 – PROCESS ROUTES FOR MAKING TOPS

Top-producing accounts for some 15 per cent of the total conversion cost from raw wool to finished worsted fabric and, although far removed from the final stages of cloth production, the basic characteristics of the fabric in terms of quality and yarn type are determined to a significant degree by the top stage. The performance of the sector insofar as variety and maintenance of quality standards are concerned is, therefore, vital to the entire worsted industry, even though the later stages of processing make up a much more significant proportion of total conversion costs.

The present overall sequences of processes shown in Figure 9.1 appear unlikely to be radically changed by the mid-1970's; however, it is anticipated that there will be rapid growth in the tow-conversion field, and some reduction in the traditional wool and hair-combing activities. Machinery development is taking place in the individual stages, such as scouring and carding; these will be assessed in the appropriate articles of this chapter, but are not expected to affect the overall pattern of necessary processes.

Raw material consumption by the sector in the mid-1970's is shown below, with present figures for comparison.

| *Fibre* | *Consumption (m lb per year)* 1968 | 1975 |
|---|---|---|
| *Raw wool and hair:* | | |
| Merino | 133 | 112 |
| Crossbred | 115 | 101 |
| Hair | 15 | 15 |
| *Man-made fibres:* | | |
| Acrylics | 28 | 40 |
| Polyesters | 27 | 42 |
| Polyamides | 11 | 16 |
| TOTALS | 329 | 326 |

Thus total sector throughput is not forecast to change significantly, although the man-made fibre percentage is expected to rise from 20 per cent to 30 per cent, of which 93 million lb will be tow and the remaining 5 million lb staple.

## 9.2 Wool sorting

The complete process of sorting the animal fibres entering the worsted processing stream is one which commences with the initial classing of the fleeces in the country of origin, and is completed with the sorting activity carried out at the mill.

There are basically two approaches to this process: the first, which is largely followed in this country, is that of developing a high level of specification for the fibre to be processed in any given lot (i.e. that which will eventually be converted into a top). The initial classing in this system is relatively rudimentary, so that there is a considerable amount of activity required at the mill to sort wool from the fleeces contained in a given bale or group of bales. The result is that upwards of £4 million per year is spent in this country on the sorting process; typical costs of sorting to the standards required by the UK industry are illustrated below, assuming male sorters on single shift, in old buildings:

| *Wool type* | *Cost of sorting (pence per lb)* *1 m lb per year* | *4 m lb per year* | *10 m lb per year* |
|---|---|---|---|
| Mixed English | 2·0 | 1·7 | 1·6 |
| Imported crossbred | 1·2 to 1·8 | 0·8 to 1·4 | 0·7 to 1·3 |
| Merino | 1·1 to 1·5 | 0·7 to 1·1 | 0·6 to 1·0 |

The figures illustrate the increased cost of sorting coarser wools, together with the small economies of scale of the process.

The alternative approach, which tends to permit a lower control of the specification of the final product, but eliminates a significant part of the cost of sorting, is that commonly adopted in, for example, the United States. The wool is normally purchased by private treaty, and a higher degree of fleece-classing is carried out in the country of origin but little sorting is performed at the mill. This means that any variations of fibre within a given fleece will be neglected, so that a batch classed as nominally 64's might well contain fibres within the 60's-70's range, though all these would be included in the final top produced as a 64's quality. The additional costs of this classing in the country of origin are lower than the mill sorting costs, although the resulting tops are less well specified and will not claim the premium which may be charged for the better-defined product.

The main issue is to decide the level of classification required and to ensure that only adequate sorting is carried out. In the long-term, there may be scope for adoption by the British industry of the American system in the case of South American wools, where the United Kingdom is the major customer and buying is by private treaty already. There is no question but that the level of classification of wools for the specialist trade should continue to be maintained, and that every advantage should be taken of the quality reputation of the United Kingdom industry. This will assist in enabling an adequate price to be consistently obtained for the top by minimising the chances of poor quality fibres lowering its nominal quality and marring the final product, which is the sort of defect already occasionally complained of by some of the industry's customers.

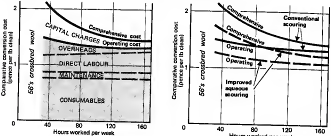
Sorting in this country is a wholly manual activity, carried out on a single-shift basis using male labour. Whilst there are certain areas of the trade, especially those concentrating on very high-quality products, for which the introduction of shift working in sorting would be ill-advised due to the extreme level of skill required, the industry could with some advantage adopt a measure of shift working, provided that the conditions under which the sorting is carried out are adequately maintained to ensure consistency of performance; and costs could be reduced by introducing female labour sorting heated bales with some degree of mechanical handling. However, such increased level of shift working will only result in a marginal reduction in overall sorting cost, due to the high labour content of the process; such advantages as there are accrue from the better use of buildings and wider spread of overheads. On the whole, therefore, little major change is proposed in the pattern of sorting in the industry.

### 9.3 Scouring of worsted raw materials

Although the quantity of sorted wool which will be scoured on the worsted system by the mid-1970's will be some 12 per cent less than at present, there are significant changes during this period to be advocated both in operating practice and in plant used. The performance of the conventional scouring sets of the harrow type can now be bettered in terms of conversion cost and product quality, and although the actual reduction in conversion cost is less than a penny a pound, it is most probable that the new improved aqueous methods will replace conventional scouring when existing equipment becomes obsolete. These new processes are typified by the improved aqueous scouring sets developed by WIRA and by others using harrow or jet circulation or solvent scouring. The current situation is that the improved aqueous methods are the more highly-developed, and are at present considerably more economic than solvent scouring when all cost elements, including solvent recovery and effluent disposal, are taken into account. Further development of solvent scouring could reverse the position by the mid-1970's.

The advantages of these improved scouring methods lie not only in increased throughput with reduced water consumption for a given size of plant, but also in producing a product which requires a smaller carding effort, finally yielding a lower percentage of noil during combing. The savings which will accrue from this reduction in noil are likely to be much more significant than the reduction in scouring conversion cost.

Representative conversion costs for good average practice are given in Figure 9.2, for a throughput of some 1,000 lb per hour of a 56's crossbred wool with an assumed clean yield of 60 per cent. This size of plant is sufficient to enable full processing economies to be achieved in terms of the use of plant and direct labour, together with reasonably efficient overheads directly associated with the process. Figure 9.2(a) shows a typical breakdown of the operating and comprehensive costs (defined in the Definitions and Assumptions paragraphs following the Introduction) for conventional harrow scouring, and indicates the significance of the consumables and direct labour elements on the operating cost, and the additional capital charges for new plant of this type. These capital charges are taken at an annual rate of 20 per cent, which corresponds to a discounted cash flow rate of 12 per cent as defined in the earlier sections of this report.



(a) Conventional scouring

(b) Cost comparisons

FIGURE 9.2 – COMPARATIVE COSTS OF WORSTED SCOURING

It is evident that the operating cost is little influenced by variations in the level of shift working, as the economies in overheads which can be achieved at the higher levels of plant utilisation are offset by the shift premia.

Comparative operating and comprehensive costs are also given in Figure 9.2 (b) for a typical improved aqueous scouring process, from which it is clear that the newer system shows economies in both operating and comprehensive costs over the traditional methods; the comprehensive cost of the improved method is marginally lower than the operating cost on the existing method for operation in excess of some 100 hours per week. These savings result from a reduction in the specific cost of consumables and direct labour, although the capital charges per pound of clean-scoured wool are relatively similar for the conventional and improved aqueous methods. The cost comparisons are based on representative batch sizes of some 10,000 lb, allowing for a down-time of some 30 minutes between batches, and complete washout after some 100,000 lb throughput.

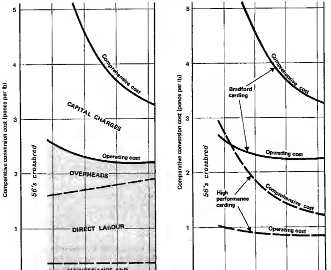
In the light of the improved economics and product quality of these new techniques, it is recommended that some 20 per cent of the scoured wool output of the industry should be produced by the new methods by the mid-1970's. It is likely that the extreme pressure for greater profit margins in tops will lead to the operation of these new sets at a very high level of shift operation, the final decision as to whether this operation can be made virtually fully-continuous depending on local labour availability and the practicality of round the clock working in a particular area.

The figures in Tables 9.1 to 9.3 (at the end of this chapter) typify operation in the mid-1970's in worsted raw material scouring. The effect of these changes will be to reduce the labour force employed in worsted scouring by some 30 per cent from the present level, a change which is put into context in Chapter 16.

### 9.4 Worsted carding

The industry's output of carded sliver will be reduced by a marginally smaller amount than the 12 per cent reduction in scoured wool by the mid-1970's, due to the fact that the scoured wool produced for later processing on the woollen system will itself fall by some 5 million lb per year. The changes in the carding and associated processes which will take place over the next few years will be largely concerned with the improvement in overall performance of the newer existing plant, and with the replacement of the oldest cards at present in operation. These improvements will comprise the introduction of greater bed-width sets with metallic, as opposed to fillet, clothing, with a corresponding reduction in the number of swifts per card. There is unlikely to be any significant change in the processes of long wool preparer-gilling, which will account for some 2 per cent of the throughput of scoured wool on the worsted system in the mid-1970's.

Representative conversion costs are given in Figure 9.3 (a) for conventional Bradford cards (typically 60 inches bed-width, double-swift with fillet clothing throughout) and, in Figure 9.3 (b), for high-performance, Continental-type cards (typically 87 inches wide, with largely metallic clothing on the single swift and rollers). The comparative costs are given for an 18-card shop with a throughput of some 1,500 lb per hour on Bradford cards, and approximately twice this amount on the high-performance units; in each case batch sizes of 10,000 lb have been assumed. The improvements in output and the efficiency of the



(a) Bradford carding (b) Cost comparisons

FIGURE 9.3 — COMPARATIVE COSTS OF WORSTED CARDING

high-performance units results largely from reductions in the direct labour and capital charges per lb of carded worsted sliver produced, the direct labour required per set being much the same. It is evident from Figure 9.3 (b) that there are considerable advantages in installing the high-performance cards, even when comparing the use of an existing Bradford card with a new high-performance unit, and it is recommended that many of the existing cards should either be modified (for which costs intermediate between those shown on Figure 9.3 (b) will result) or be replaced by new high-performance units.

The reduction in comprehensive costs with the increase of the level of shift working is particularly significant with the high-performance units, and it should thus be a policy for the new or highly-modified plant to be operated for as many hours per week as possible, or, in the case of integrated top-producing plant, for the number of cards in operation to be reduced so that the plant in operation is fully utilised. There are, therefore, a number of pressures which all tend to lead to a reduction of the number of individual worsted carding sets in operation, in addition to the fall of some 12 per cent in overall throughput of the sector. Over the past seven years it is, therefore, envisaged that the total number of worsted cards should fall by some 50 per cent, due partly to the higher output per card resulting from the improved clothing standard, and also partly to the wider beds of the new or recently-modified plant.

The future pattern of worsted carding, shown in Tables 9.1 to 9.3, assumes an average increase in rate of output of some 20 per cent per set. The direct labour is virtually all male and, with increasing shift working, must remain so. The changes proposed will reduce the current labour force by some 30 per cent over the next seven years.

The longer-term trend should be a continuation of the improved standard of plant by the introduction of superior clothing and wider beds with a reduced number of swifts per card, so that the majority of the plant in the industry will eventually be operating to the new Continental standard. By this time there may well be other methods of fabric production and these could modify the requirements of the industry for carded animal fibre, both in quantity and quality, in that these fabrics could be produced directly from non-spun carded webs. There is, however, little evidence that processes of this type will be significant by the mid-1970's.

## 9.5 Combing

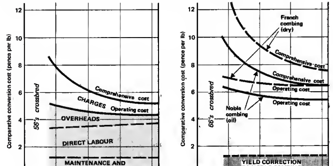
In the nineteenth century, when the United Kingdom wool textile industry was dominant, high standards of tops, worsted yarns and cloths were established using an oiled top, and oil-spun yarn systems based on Noble combing; with the passing of time, numerous (largely mechanical) developments were made to the Noble combs and associated equipment, with the result that this type of plant is now highly-developed and is in a position where it has been virtually fully exploited from the point of view of improvements in throughput and efficiency. In the setting-up of new textile industries in other countries the majority of overseas operators have adopted the simpler and more easily-operated French dry combing system, which, although it cannot produce such a sleek top, supplies products which are adequate for a large part of the bulk weaving trade and are, it has now been discovered, particularly well suited for use in hosiery applications.

The situation today is thus one in which the United Kingdom has a vested interest in the Noble combing system, as it possesses a considerable heritage of plant both for oiled top and oil spun yarn production, whilst the majority of overseas wool textile industries have concentrated on the dry top and yarn system. Until the growth of the hosiery industry, the bulk of home demand has always been for oiled tops, whereas the export markets have largely required dry. There are several reasons why the industry in the United Kingdom should concentrate to a much greater extent on the production of dry combed tops in the future; these include the continuing steady growth in demand of material for the hosiery trade, for which dry spun yarns are especially suitable, and the increased use of dry ring spinning systems, and package yarn dyeing.

The choice of the best type of comb to be used in the future is less clear, as there is considerable difference of opinion within the trade as to the merits of Noble combing systems for making dry combed tops. Although there are certain sections of the industry which favour the almost universal use of Noble combs in this country, it is our opinion that the top-producing sector would be unwise to continue to concentrate on the use of this system in the light of the following:

1. Although the conversion costs favour the Noble system at present, current developments are likely to reduce the costs of producing dry combed tops on French combs to at least the level that can be achieved using best Noble practice. The conversion costs shown in Figure 9.4 are for good average practice in a modern 30-comb plant covering all processes from carding to the finished top. The 'yield correction' for the Noble combed top has been derived from typical finished top and noil prices and average tear rates for the two processes, and is included to enable a true comparison to be obtained between the effective conversion costs of the two systems.
2. Resulting from the extensive overseas use of French combing, the development of this system should proceed much more rapidly in the future than Noble processes.
3. The level of skill required for efficient operation is greater in Noble than in French combing. Thus, in the future, the labour costs are likely to rise more rapidly on the Noble system, due to the increased premium for skill and the costs of additional training, even assuming the availability of suitable labour.

It is thus recommended that there should be a change in emphasis from the use of Noble to French combing over the next seven years; little justification is foreseen for further investment in new Noble combing units, except for certain specialised applications.



(a) Noble-combing (oil) (b) Cost comparisons

FIGURE 9.4 — COMPARATIVE COSTS OF COMBING

The future pattern of activity in combing and associated processes will thus result from the combination of a number of trends which will favour specific actions in certain areas of the industry. At the fine end of the weaving trade, there should continue to be a concentration on the use of the oil top system for the high-quality prestige market, and, even in the long-term, it is unlikely that replacement of the Noble combs by French units will be justified here. In this particular area there is also little pressure for a high level of shift operation until the justification for new plant arises, which is not likely to be in the near future due to the level of over-capacity existing at the present. In the bulk weaving and hosiery trades, however, there should be a steady swing towards the use of French combing, and there is little justification for further investment in Noble combs in this area. A number of the French combs and associated plant at present in use are somewhat obsolescent and there will need to be a significant level of plant replacement in order to make full use of the most efficient and economic equipment available. The production of tops for hand knitting and speciality yarns is likely to continue to be largely on the oil system with Noble combing for some time in the future, although as this particular trade is markedly influenced by the dictates of fashion and the need for special effects in the yarn itself, any prediction is open to doubt.

By the mid-1970's, the overall picture in combing should, therefore, approximate to that shown in Tables 9.1 to 9.3. These changes, towards French combing nearly half the total output of wool and hair tops, are likely to result in the reduction of the labour force by some 15 per cent over the next seven years. The level of acceptance of the dry top and yarn system is one which will not solely depend on the top producing sector, as it clearly involves the whole of the worsted sector; the rate of change from oil to dry is thus one which will result from the combined pressures on the top-producing and worsted spinning sectors of the industry, both of whose long-term interests will undoubtedly be best served by a greater concentration in the dry combing and spinning activities.

## 9.6 Tow-to-top conversion

The process of making tops from man-made fibre by direct conversion from tow is likely to increase significantly in the next seven years, as shown on Figure 9.1. This increase is a direct result of the forecast greater requirements in the United Kingdom for fabrics and yarns containing, or wholly composed of, man-made fibres, as summarised in Table 6.11. This could involve considerable capital investment because there is a very small level of over-capacity existing in the industry at present, even with operation on a 'round the clock' basis, as Table 1.8 shows. Much of the extra capacity required, however, will be available from turbo-staplers currently installed by British producers in the Netherlands and other Continental countries but being transferred into the United Kingdom following the establishment of the Dupont plant in Ulster.

Methods of manufacturing and processing man-made fibres are still at a stage of development where dramatic advances are by no means unlikely in the future, although the only technical innovations which are in evidence at present in the field of tow-to-top conversion are those of stretch breaking techniques, which, it is claimed, give improved spinning performance and top dyeing characteristics without the need for recombing. Although such techniques will be used in special circumstances, such as for the production of high-bulked yarns, it is currently envisaged that most of the conversion will be on conventional machines.

The future pattern of tow-to-top conversion is likely to show an even higher level of multi-shift working than today in the light of the conversion costs shown in Figure 9.5. An increase of some 70 per cent in the required output of converted tops over the next seven years will involve the installation of further convertors equivalent to 30 per cent of those existing, with the result that the advantages of the lower comprehensive costs associated with very high levels of shift working will be particularly relevant. Thus most tow-to-top conversion plants should be operating 'round the clock' in the future, and although this will involve the recruitment of some additional male labour, the fact that the processes involved are very capital- rather than labour-intensive will mean that the additional manpower required is small. Even so, there should be an increase of more than 50 per cent in the direct labour employed in this sector by the mid-1970's. The basic operating practice of the sector should

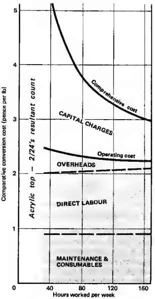


FIGURE 9.5 – COSTS OF TOW-TO-TOP CONVERSION

therefore be as shown in Tables 9.1 to 9.3. Of the 27 sets to be installed, however, probably around 18 are already being repatriated from the Continent, leaving a net requirement for only 9 new sets.

## 9.7 The future of top production

In assessing the overall future of top production in the mid-1970's, a number of salient points emerge which will dominate the activity of the sector in the future. There will be a 12 per cent reduction in overall throughput of combed tops (to some 175 million lb per year), and an increase of some 70 per cent (to 91 million lb) in the throughput of converted tops, although the total production of tops will, by coincidence, remain almost constant. Changes in individual processes have already been discussed in some detail and these will apply in varying degree to the separate classes of product manufacture. There are additional factors, however, such as the minimum economic size of production unit, and the advantages or otherwise of considering re-building or re-location, which must be evaluated.

Typical economics of scale of combed top production are shown in Figure 9.6. The curves shown are for fine top production; from similar curves for the other classes of top, the corresponding optimum sizes of operating unit have been derived. In each case, conversion costs are given for what are, in effect, the two extreme cases of operation possible, namely, operating a 40-hour week (normal single day-shift) with new plant (comprehensive cost) and 'round the clock' operation, taken as 160 hours per week, with existing plant (operating cost). The operating cost will vary but little with higher levels of shift operation, due to the fact that the increased cost of direct labour resulting from shift premia will in practice largely balance the economies of scale of the overhead items which contribute to the conversion cost. For example, the operating cost curve for multi-shift operation on Figure 9.6 is within some 5 per cent of the similar curve for 40 hours per week operation, and this comparison is typical for all classes of top production. The solid arrow on Figure 9.6 refers to the mill size above which further economies are not achieved; the hollow arrow shows the size of mill below which operation with existing plant will be more costly than operation with new plant for a larger size of production establishment. This latter thus represents that mill size below which operation can be regarded as uneconomic unless there are additional reasons (such as specific market requirements resulting from fashion, the speciality nature of the product, etc.) which will enable the top producer to obtain a price premium for his product. These optimum sizes are clearly based on the assumption of good and efficient management and should be regarded as a guide rather than an exact level of output. They do, however, illustrate the need for production units of adequate size if advantage is to be taken of the economies which exist in processing and management.

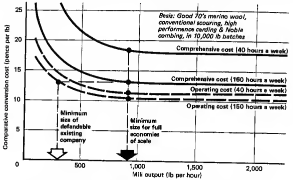


FIGURE 9.6 – ECONOMICS OF SCALE IN TOP PRODUCTION

The influence of batch size must also be taken into consideration, and from a number of studies taken across the industry during the course of this investigation, the data shown on Figure 9.7 have been derived. This diagram indicates the order of increase of the conversion cost due to operation with batches below that at which reasonably full economies of batch size may be assumed, the point of 'full economy' being taken as that batch size beyond which the use of larger batches could not realise more than an additional 1 per cent reduction in operating costs. The batch sizes assumed for the conversion costs, and thereby determining optimum plant sizes, are given in Table 9.1 and these correspond to the points of full economies of batch size as given in Figure 9.7.

The only area in which a significant increase in plant capacity is envisaged by the mid-1970's is in tow-to-top conversion, and there is a justification in setting-up the new plant required in a Development Area to make use of the Government grants on new plant and buildings. There are no other cases in top production where new buildings are generally justified.

The proposed pattern of overall business activity in this sector is thus given in Tables 9.1 to 9.3. These show the area of capital investment, quantities of plant which will be

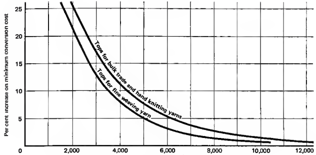


FIGURE 9.7 – ECONOMICS OF BATCH SIZE IN TOP PRODUCTION

redundant by the mid-1970's, and the minimum size of operating units for efficient and economic production as previously discussed. The actual minimum sizes in terms of annual output are derived from the optimum hourly outputs and the average level of shift working, both shown in Table 9.1.

Table 9.1 – Output of tops in the mid-1970's

| *Product* | *Output in mid-1970's (m lb per year)* | *Operating hours per week* | *Typical batch size (lb)* |
|---|---|---|---|
| Fine tops | 20 | 90-120 | 10,000 |
| Bulk weaving and hosiery tops | 135 | 120-140 | 12,000 |
| Hand knitting tops | 20 | 100-120 | 13,000 |
| Converted tops | 91 | 160 | continuous |

Table 9.2 – Top production plant in the mid-1970's

| *Type of plant* | *Output in mid-1970's (m lb per year)* | *Average hours per week* | *Number of sets or combs* | | | |
|---|---|---|---|---|---|---|
| | | | *TOTAL required* | *Existing* | *To be purchased* | *To be scrapped* |
| *Scouring:* | | | | | | |
| Conventional | 178 | 100 | 53 | 110 | – | 57 |
| Improved aqueous | 50 | 140 | 5 | 1 | 4 | – |
| *Carding:* | 208 | 120 | 400 | 800 | 100 | 500 |
| *Combing:* | | | | | | |
| Noble | 90 | 90 | 410 | 840 | – | 430 |
| French | 85 | 140 | 670 | 620 | 150 | 100 |
| *Tow conversion:* | 91 | 160 | 140 | 113 | 27 | – |

Table 9.3 – **Mill size in top production**

| | *Mill size (lb per hour)* | | *Average operating hours* | *Mill size (m lb per year)* | |
|---|---|---|---|---|---|
| *Product* | *For full economies* | *Defendable existing* | *per week* | *For full economies* | *Defendable existing* |
| Fine tops | 800 | 300 | 105 | 4·2 | 1·6 |
| Bulk weaving and hosiery tops | 1,600 | 800 | 130 | 11·2 | 5·6 |
| Hand knitting tops | 1,600 | 600 | 110 | 4·8 | 1·8 |
| Converted tops | 1,600 | 800 | 160 | 12·8 | 6·4 |

# Chapter 10 Production of worsted yarns

## 10.1 Processes for making worsted yarn

There are two main sources of worsted-type yarn; combed tops of natural fibre, and man-made fibre tops produced either by tow conversion or by carding (and possibly combing) from staple man-made fibre. A third class of yarn is that of modified continuous filament which, although not a worsted yarn, competes strongly in numerous end-uses hitherto using spun worsted yarns. The modification of continuous filaments does not take place within the present definition of the wool textile industry but is outlined in Article 10.4.

Figure 10.1 illustrates the three main process areas of drawing, spinning and twisting; the drawing and spinning activities are normally matched both in terms of process type and output, so that in practice, yarn production systems are integrated drawing and spinning operations rather than drawing followed by a separate spinning activity.

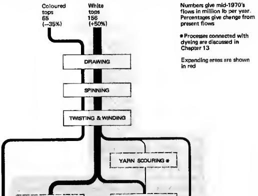


FIGURE10.1 – PROCESS ROUTES FOR WORSTED SPINNING

Numerous systems exist for drawing and spinning, each having its particular merits for particular qualities of tops, count of yarn, and end-use. As an example, twelve different drawing systems can be distinguished, viz. traditional Bradford open drawing with or without auto levelling, traditional Bradford cone drawing with or without auto levelling, New Bradford, Unifiex, Heavy Roving, American, Anglo-American, Old Continental, Modified Continental, and New Continental. Similarly for spinning, frames may be low-draft (i.e less than 10) cap, ring or flyer, medium-draft (10 to 40) ring, Ambler Super Draft cap or ring, medium or high draft (apron) ring, or worsted mule. Comparative costings of selected drawing and spinning systems are given later in the chapter, but it is not possible, nor meaningful on an industry basis, to consider all possible combinations of drawing, spinning and twisting systems.

As Figure 10.1 illustrates, it is recommended that there should be an overall trend towards the spinning of white tops, as opposed to coloured, during the next seven years, due to the greater emphasis on yarn dyeing discussed in Chapter 13. This will have a significant influence on batch sizes and overall process costs of worsted spinning, and will enable much fuller advantage to be taken of the more modern drawing and spinning systems. It will also enable significant stock reductions to be achieved, for both production back-up and, in terms of finished products, for customer service. With the introduction of a greater degree of yarn and top standardisation, as advocated in Chapter 15, the whole worsted system production cycle should be very much shorter than is currently the case.

Current developments in worsted drawing, spinning and twisting are largely directed towards reducing the number of individual stages, especially in drawing, and to the production of larger packages of knot-free yarn. No detailed estimates of the potential economic advantages of new worsted spinning systems, such as the self-twist or twistless methods being developed on the Continent and in Australia, are available at present, and it is not possible to forecast their impact by the mid-1970's. However, the fact that worsted yarn production contributes between 20 and 30 per cent of the total conversion cost of typical cloths indicates that a great deal of interest in the new processes, which reputedly can offer marked reductions in cost, is justified. Although these new worsted spinning techniques will not be fully developed for a number of years, in the long term it is likely that they will have a significant influence on the wool textile industry, and any future capital investment in this sector should only be made in the light of their then state of development.

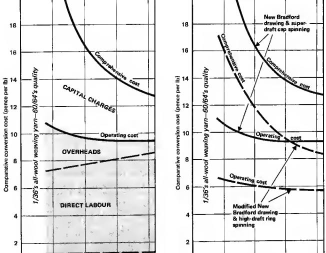
## 10.2 Worsted drawing and spinning

The processes of worsted drawing and spinning are significant contributors to the overall cost of conversion of wool textile products, and competition from modified continuous filaments and yarns spun using other systems (e.g. modified cotton or semi-worsted) is likely to increase the pressures for cost reductions. However, it is significant to note that many overseas textile producers, especially the USA, regard yarn quality as the most important factor in their ability to achieve economic fabric production, and in the main tend to favour a better yarn for a given fabric quality in order to avoid excessive faults in manufacturing.

The issue of the relative merits of the oil and dry systems is of major significance to this sector, as was mentioned in the previous chapter. The arguments for and against depend to a high degree on the subjective appraisal of cloths, there being little factual evidence one way or the other. However, the reasons given in Article 9.5, together with modern developments in dry spinning and fabric finishing techniques, tend to suggest that the oil system is no longer essential to preserve the character of British cloth. In our view, the balance should shift towards dry systems, especially as most oil-system machinery can in any case continue production on much lower oil contents than are presently used. It is notable that virtually all new machinery developments are directed towards dry spinning rather than oil.

Representative costs (see Definitions and Assumptions) for a bulk-trade weaving yarn are given in Figure 10.2, showing the comparison between a conventional system of New

Bradford drawing followed by superdraft cap spinning, and a shortened New Bradford drawing system (autoleveller gill and drawbox, and open-drawing finishers) followed by high-draft ring spinning. These costs are for good average practice using 7,500 lb batches, and apply to operation on the oil spun system, although costs on a dry spun system would be little different; in the latter case ring spinning would be preceded by apron drafting, as opposed to the roller drafting of oil spun yarns. It is clear that there are advantages in operating the short New Bradford drawing and ring spinning plant even when the capital charges relating to the acquisition of new equipment are taken into account, provided that the level of shift operation is high. These conversion costs relate to up-to-date equipment of both types, the conversion costs resulting from the use of older, less efficient plant being considerably higher in each case. For the production of bulk weaving and hosiery yarns, therefore, the emphasis should tend to be on the use of shortened New Bradford or New Continental drawing followed by high or super-draft ring spinning, with such processes as the heavy roving system (oil or dry) also finding an increasing usage in the future especially for the lower counts. Typical roving weights will be at least 40 drams, with resultant spinning packages of 6 oz, giving substantial improvements over the present standards in terms of knot-free yarn output.



(a) New Bradford drawing and cap spinning (b) Cost comparisons

FIGURE 10.2 – COMPARATIVE COSTS OF WORSTED DRAWING AND SPINNING

It is anticipated that much of the older ring spinning equipment at present in use will require replacement before 1975, and it is probable that most of the 30 per cent of present ring spinning plant which is over 20 years old will become obsolescent by then.

In the production of fine quality high-count weaving yarns, there will still be need for cap spinning on the oil system, and yarn producers should retain some 0·5 million cap spindles by the mid-1970's. These should be operated on a low level of shift activity by female labour. New Bradford drawing sets are likely to be used with roving weights of some 40 drams, and many of the cap frames (largely high-draft) should be fitted with auto-spinners to reduce the cost of piecening. Spinning packages must remain relatively small, although minor improvements in the operation of cap frames could increase these to 2 oz. This, together with the introduction of a greater measure of automatic doffing, will further reduce present conversion costs. In the long-term it is likely, however, that the high degree of international development activity in ring spinning will enable even the finest of yarns to be ring spun, as they currently are in Japan, and there must therefore be strong justification before replacing existing cap spindles by new frames of a similar type. In any case, the existing heritage of cap frames in the industry should be more than sufficient for the United Kingdom to produce its fine-quality yarn requirements for the next seven years.

Hand knitting yarn is at present almost exclusively flyer spun on the oil system, after drawing on New Bradford equipment. It is claimed that flyer spinning imparts the necessary loft, softness of feel and resilience which are the requisites of a good hand knitting yarn, and although claims are at present being made that such characteristics can be produced using a modified form of ring spinning with medium-draft rollers, it is probable that the bulk of the hand knitting yarn will continue to be flyer spun. Typical roving weights are likely to increase from the present 20 drams, although spinning packages may well be limited to the present range of 4 to 6 oz. Production batches of at least 10,000 lb will be required for maximum efficiency. Perhaps more significant than the possibility of ring spinning hand knitting yarns is the potential of the modified heavy roving system with very large roving and batch weights. Although the claimed conversion costs, even allowing for the capital charges associated with the purchase of new plant, appear very attractive, it is probable that further development of this system will be largely devoted towards the bulk weaving and hosiery trade rather than hand knitting yarns. Flyer spinning will also continue to be used for a number of speciality yarns, with a low level of shift working on the fully-depreciated plant.

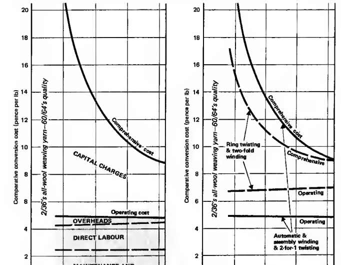
The use of numerous older drawing methods, and mule spinning, will virtually die out in the near future, apart from certain isolated cases where speciality or novelty yarns justify their retention on a small scale.

The future pattern of worsted yarn production should thus be one of a large proportion of ring spinning on a relatively high level of shift operation; virtually all the new plant should be run almost continuously, with most of the older plant continuing to operate at its present rate of some 60 hours per week. Cap and flyer spinning systems should contribute a smaller proportion of total worsted yarn production, their output being concentrated in those product areas which justify these more costly yarn-producing processes on quality or performance considerations.

### 10.3 Worsted twisting and winding

The processes of yarn twisting and winding on the worsted system are often as significant as the basic yarn production in terms of their contribution to the overall conversion cost, although the degree to which they are required depends to a great extent on the need for particular effects, appearance, and other fashion dictates in the final cloth or yarn. Thus, although assessments have been made of the relative merits of various types of worsted twisting and winding, it is not possible to evaluate quantitatively requirements in terms of future capacity or plant types.

The most recent developments in twisting and winding have been directed towards the production of larger knot-free yarn packages, in order to minimise weaving inefficiency and faults. The conversion costs given on Figure 10.3 show the comparison between a conventional system of twisting and winding compared with a semi-automatic large-package method. In the methods considered, which are representative of existing good practice and the most up-to-date machinery available, the conventional operations consist of ring twisting followed by two-fold winding, whilst the more automated process is a three-stage operation consisting of automatic and assembly winding followed by 2-for-1 twisting. It is clear that the advantages of the latter process can only be fully achieved at relatively high levels of shift operation, if the installation of new plant is considered, and thus it is likely that much of the twisting and winding equipment at present in use will only be replaced by the more modern plant when the maintenance costs begin to rise as the equipment wears out. In the cases where a high degree of twisting and winding is required, as for example with hand knitting yarns, the pressures to install new equipment will tend to be greater than those evident from Figure 10.3; the concentration of new twisting and winding equipment will thus tend to occur in association with the flyer spinning production units for hand knitting yarns, and in the bulk weaving and hosiery areas where new ring spinning equipment has been installed working on the dry spun system.



(a) Automatic winding & 2-for-1 twisting

(b) Cost comparisons

FIGURE 10.3 – COMPARATIVE COSTS OF WORSTED TWISTING AND WINDING

## 10.4 Filament modification

The process of modification of continuous filament man-made fibres has not hitherto been considered to be within the boundaries of the wool textile industry for the purposes of this study. However, there is little doubt that the use of these yarns in the textile industry as a whole will increase considerably over the next seven years; Chapter 6 forecasts a doubling of home consumption of filament yarns. It is therefore appropriate to consider the manner in which the activities of this sector will impinge on the wool textile industry.

The throwsters have increased their output by some 300 per cent over the last five years, as shown below, in million lb per year:

| *1964* | *1965* | *1966* | *1967* | *1968* |
|---|---|---|---|---|
| 40 | 46 | 60 | 78 | 118 |

A planned increase in capacity of some 50 m lb has been quoted for the next 12 months. The main outlet for this modified filament yarn is the hosiery trade, and at present, machine knitting uses 80 per cent of the filament fibre produced in this country. Of the remainder, the majority is used in tufted carpets, whilst some 5 per cent is used in woven cloths of various kinds. The polyamides and polyesters are dominant in this field, and the majority of the texturising is carried out by some form of the basic 'false twisting' process. Other methods of filament modification, such as the stuffer-box, air-jet, edge or gear crimp or knit-de-knit techniques, tend to be used only where specialised or high-quality yarns are required, as few of these processes can match the extremely high throughputs which can now be achieved with modern false twisting equipment. Some work is being carried out on filament modification by chemical processing, particularly in the USA, although at present the dominance of false twisting seems likely to continue for some time.

The range of possible variation in terms of bulk, texture and appearance is extremely wide, especially in the light of the recent introduction of various forms of basic fibre, each of which can be modified in a number of ways, using a basically similar process. The use of homo- and co-polymers, each of which may be supplied as fibres with varying degrees of lobality, has become widespread in the last two or three years, and this has enabled the texturised filament yarn to be used for an increasingly wide range of end-uses.

The fact that the actual processes of filament modification are highly capital-intensive, and depend critically on the characteristics of the basic fibre used, has led to a very close association between the fibre suppliers and the throwsters. One of the most successful families of modified fibres has been produced by a number of throwsters selected by the fibre producer and given exclusive rights for the production of the branded modified yarn, and it would seem likely that this form of association is likely to be considered by other fibre suppliers in the near future. This close liaison between the raw material suppliers and the throwsters may make any major attempt on the part of individual companies in the wool textile industry to enter the field extremely difficult unless a working arrangement can be set up with a fibre producer. In certain isolated cases an interest in filament modification has already been achieved, although it seems doubtful whether the fibre producers will relinquish any of their virtual control of the throwsters' activity in the future. Nevertheless, the field of continuous filament modification is such an important growth area that, in spite of possible opposition from fibre producers and throwsters, the wool textile industry should seek every opportunity of entering it. It is not impossible that, in the distant future, it could largely replace worsted spinning.

## 10.5 Future of worsted yarn production

Changes in the overall pattern of activity in the field of worsted yarn production over the next seven years are likely to be dominated by the swing towards the use of dry drawing and spinning systems, particularly in the bulk weaving and hosiery yarn-producing sector. The overall production of worsted yarns should rise by some 10 per cent by the mid-1970's, the larger part of this increase being for knitting. There should also be an increase in the processing of white as opposed to coloured tops, thus enabling worsted spinners to increase average batch sizes, and to consider providing stock services to manufacturers. The requirements of the downstream processes (such as dyeing and manufacturing) will tend to be towards increased yarn package sizes throughout. The proposed outputs of the major types of product of the sector are summarised in Table 10.1, together with suitable ranges of operating hours per week for their production and recommended batch sizes.

Typical economics of scale for producing a selected bulk weaving yarn are shown in Figure 10.4. The conversion costs are based on plant operation at 40 hours per week (nominal single day shift) and for virtually 'round the clock' working, with both new and fully written-off equipment. The operating costs of an existing production unit running at 160 hours per week are some 5 per cent below those quoted for operation at 40 hours per week, the savings in overhead recovery more than compensating for the increased shift premia. The mill sizes (in terms of lb per hour output) for full economies of scale, and that below which there appears to be insufficient return to justify continued operation on standard products, have been derived as shown in Figure 10.4 for a range of worsted yarns, the resulting data being quoted in Table 10.3, at the end of the chapter. Reasonably full economies of scale are reached at 330 lb per hour for mills producing the finer weaving yarns, which corresponds to an output of some 1 m lb per year assuming operation at 60 hours per week, as shown in Table 10.3. A unit of this type using the cap spinning system should still be able to produce economically with existing plant down to a mill size of only some 50 lb per hour output; in order to justify the continued operation of a unit smaller than this, some novelty or specialisation would need to exist in the product to enable an additional price premium to be obtained to offset the additional conversion cost. In this sector it is estimated that some 50 per cent of the existing cap spindles, with associated drawing equipment, will need to be scrapped over the next seven years, leaving some 0·5 million spindles of this type operating

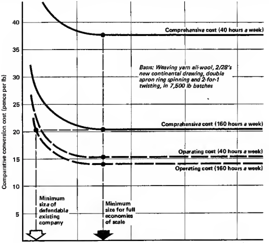


FIGURE 10.4 – ECONOMICS OF SCALE IN WORSTED YARN PRODUCTION

by the mid-1970's, as shown in Table 10.2. The majority of these cap frames should be fitted with auto-spinner attachments if current works trials prove successful.

The production of bulk weaving and hosiery yarn, which should be largely on dry spinning and drawing systems, will need to be carried out by larger production units, reasonably full economies of scale not being achieved until an output of some 800 lb per hour is reached, again shown in Table 10.3. Assuming that some 25 per cent of the existing ring spinning units at present operating are shut down as being obsolescent during the next seven years, some 0·31 million new ring spindles will need to be installed, and these will constitute 40 per cent of ring frame capacity by the mid-1970's. As has already been discussed in Article 10.2, the newly-installed plant will be operated at a high number of hours per week, although there is no justification for running the older plant for more than the present 60 hours per week. The average operating hours per week for the bulk weaving and hosiery yarn producing units will thus be around 100, as shown in Table 10.3, and this implies that full economies of scale will be achieved at outputs of about 4 m lb per year. The mills using entirely existing plant will not operate competitively if producing less than some 150 lb per hour unless, as previously discussed, some degree of speciality is introduced.

The flyer spun yarn-producing systems for hand-knitting yarn will need to be concentrated in units of broadly similar sizes to those for the bulk weaving yarn, i.e. 800 lb per hour for full economies of scale, although this will equate to a rather smaller total annual output, as there is no economic justification for operating at more than around 60 hours per week as at present. The minimum economic size for producing run-of-the-mill products on existing plant will be at around 200 lb per hour.

The significance of batch size for the various types of worsted yarn processes considered is shown in Figure 10.5, in terms of the increase in the conversion cost resulting from operation at below the selected batch size. This latter is that batch size above which no further significant economies are achieved; present average batch sizes, for fine weaving yarns in particular, are smaller than the selected sizes.

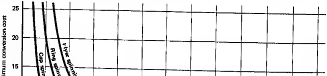


FIGURE 10.5 – ECONOMICS OF BATCH SIZE IN WORSTED YARN PRODUCTION

The question of relocation to a Development Area only arises in the case of ring spinning, where some new investment in plant is recommended. Provided existing buildings can be used in the Development Area, cost reductions of the order of 2d per lb can be achieved by the move. Against this must be set the disadvantage of increased transport costs, lack of local training facilities, and absence of, for instance, commission dyers. It is therefore recommended that mills should only move to Development Areas if they are integrated, self-sufficient units.

In spite of the discretionary Government grants on new buildings in Development Areas, there is no economic case for relocation if new buildings are thereby necessary.

**Table 10.1 – Output of worsted yarns in the mid-1970's**

| *Product* | *Output in mid-1970's (m lb per year)* | *Operating hours per week* | *Typical batch size (lb)* |
|---|---|---|---|
| Fine weaving yarns | 25 | 60 | 3,500 |
| Bulk weaving and hosiery yarns | 146 | 100 | 7,500 |
| Hand knitting yarns | 46 | 60 | 10,000 |

**Table 10.2 – Worsted spinning plant in the mid-1970's**

| *Type of spindle* | *Output in mid-1970's (m lb per year)* | *Average hours per week* | *Number of spindles (m)* | | | |
|---|---|---|---|---|---|---|
| | | | *TOTAL required* | *Existing* | *To be purchased* | *To be scrapped* |
| Ring | 142 | 100 | 0·76 | 0·6 | 0·31 | 0·15 |
| Cap | 25 | 60 | 0·50 | 1·0 | – | 0·5 |
| Flyer | 50 | 60 | 0·25 | 0·4 | – | 0·15 |

**Table 10.3 – Mill size in worsted spinning**

| *Product* | *Mill size (lb per hour)* | | *Average operating hours per week* | *Mill size (m lb per year)* | |
|---|---|---|---|---|---|
| | *For full economies* | *Defendable existing* | | *For full economies* | *Defendable existing* |
| Fine weaving yarns | 330 | 50 | 60 | 1·0 | 0·2 |
| Bulk weaving and hosiery yarns | 800 | 150 | 100 | 4·0 | 0·8 |
| Hand knitting yarns | 800 | 200 | 60 | 2·5 | 0·6 |

# Chapter 11 Production of woollen and semi-worsted yarns

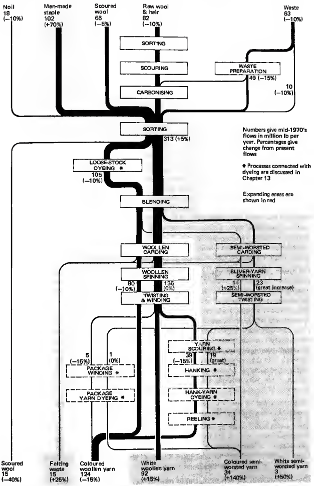
## 11.1 Processes for making woollen and semi-worsted yarns

In the production of yarns on the woollen and semi-worsted systems, there is no effective break point between the initial preparation of the raw materials and the activities associated with the making of the yarns themselves, and this whole area has, therefore, been considered as a single sector. Figure 11.1 shows the anticipated change in flows on the basis of the output predictions of Chapter 8. The existence of blended and scoured wool as a saleable intermediate product is of little overall significance, as, in almost all cases, the production activities upstream and downstream of this point are carried out within the same mill or establishment. The exception is the prepared raw material (largely man-made fibre) for the semi-worsted system, which is drawn out from the main woollen processing stream at this point.

The preparation stage, consisting of the initial sorting, scouring, carbonising, final sorting and blending of the various materials, is extremely critical, and a large part of the skill of the woollen spinner lies in his ability to select and blend the various fibres available to produce the cheapest acceptable yarn for a particular end use. The importance of the operations carried out prior to spinning tends to offset many of the advantages of making yarn to stock, as it is very often the case that a particular customer will be prepared to accept a lower-quality raw material for a particular application than the stock article. This significance of the raw material preparation processes has also accounted for the relatively high proportion of fibre colouration being carried out at the loose-stock stage, normally prior to blending, and in spite of the forecast 10 per cent reduction shown in Figure 11.1, a major part of the colour/blend variety, which is at the heart of the fancy woollen trade, should continue to be achieved by loose-stock dyeing techniques.

The most significant trend in the balance of the raw materials used by the mid-1970's will be the great increase in the use of man-made fibres in staple form, as shown in Figure 11.1. Although the use of all other fibre types are expected to decline somewhat, this growth of some 70 per cent in man-made fibre consumption over the next seven years should mean that the total quantity of fibre processed for the woollen and semi-worsted systems will rise marginally over the same period. This additional man-made fibre will largely find its way into semi-worsted yarns for the tufted carpet trade, and will be mainly dyed on hank at the yarn stage. The proportion of woollen yarn spun white should rise due to the reduction in overall loose-stock dyeing in the future, although the total weight of woollen yarn produced will change little by the mid-1970's. Table 11.1 at the end of the chapter shows recommended output levels of the major types of woollen yarns.

Despite the relatively small change envisaged in overall throughput, there are a number of developments, especially in the field of woollen spinning, which may radically affect the future pattern of operation of this sector of the industry. These are typified by the break spinning systems, which are just being introduced in this country for some cotton and man-made fibre yarns. They are rather more developed in parts of Eastern Europe, and to a lesser extent in Japan. At present, no reliable information is available for the operating economics of this type of process when applied to woollen yarns, although pilot production of some coarse carpet yarns is in hand in the United Kingdom at the present moment, and there is a great deal of activity on the part of machinery makers and research organisations in seeking further applications for break spinning systems in future. It is clear, however, that such methods are capital rather than labour-intensive, and should find more ready application in areas where large-batch production is possible. There are also likely to be other significant developments stemming from work on shortened spinning systems for natural fibres, such as has led to the establishment of the now widely-used semi-worsted methods for carpet-type yarn.



Numbers give mid-1970's flows in million lb per year. Percentages give change from present flows

* Processes connected with dyeing are discussed in Chapter 13

Expanding areas are shown in red

FIGURE 11.1 – PROCESS ROUTES FOR MAKING WOOLLEN AND SEMI-WORSTED YARNS

In terms of conversion cost, the basic processes of raw material preparation and yarn-making (excluding dyeing at the loose stock or yarn stages) each account for some 15 to 20 per cent of the overall cost of finished woollen cloth, the contribution from raw material preparation being almost constant for most classes of woollen product. The conversion cost of spinning is much more sensitive to the quality and count of the yarn required.

### 11.2 Treatment of woollen raw materials

As already stated in Article 11.1, the selection and balance of the various raw materials prior to carding is a vital part of the whole woollen system. Some improvements are being made to the speed and efficiency of the present sequence of operations by the introduction of the improved aqueous scourer, as on the worsted system, and the replacement of hand blending by a highly-automated pneumatic process; it is however unlikely that any significant modification in the overall system of producing the required blends for woollen carding will be introduced by the mid-1970's. In the preparation of materials for semi-worsted carding, however, a measure of streamlining will result from the growing use of man-made fibres with the consequent elimination of the need for the more traditional scouring, sorting and carbonising operations.

As discussed in Article 9.2, it is envisaged that a growing proportion of raw wools may be sorted and classified in the country of origin, although this will have little effect on the overall conversion cost of woollen yarns as the bulk of the sorting is carried out after scouring and carbonising, when the other raw materials required are added. Overall sorting costs on the woollen system range from 2d to 3d per lb of clean wool for the speciality trade, down to about half this figure for the tweed and greasy trade. The sorting of the recirculated material, both process waste and prepared fabric waste, costs almost as much as that of new wool, and in both cases there are virtually no economies of scale beyond those associated with the supervision of direct labour; nor are there advantages of multi-shift operation, except where the working of an extended-shift system can avoid the use of additional buildings.

The future pattern of raw wool scouring should be similar to that already discussed for the worsted system, under Article 9.3. The newly-developed improved aqueous methods show broadly similar advantages for the woollen system, although there is little justification for the wholesale replacement of existing plant until it becomes obsolete. The commission operators, whose capital is largely in plant and equipment rather than stock and work in progress, will be under the greatest pressure to install new plant, and will tend to benefit more directly from any plant improvements. The justification for capital investment in new scouring sets is much greater for operation at reasonably high levels of shift working, and the commission operators, therefore, should consider working on average many more hours per week than the non-commission producers; the actual level worked will, of course, depend largely on local social factors, and the availability of suitable labour and management. The pattern of raw wool scouring activity by the mid-1970's should thus be as shown in Table 11.2 at the end of the chapter.

The introduction of the new type of scouring equipment should reduce total manpower in woollen scouring by some 20 per cent over the next seven years.

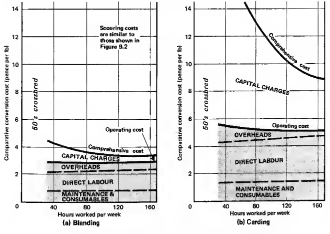
There seems little economic advantage to be gained from increasing the proportion of wool imported scoured as opposed to greasy. However, the situation may change if, in future, operators in the wool-exporting countries install modern scouring plant on a large scale. There is a slight tendency for the United Kingdom scoured wool imports to increase, but there seems little reason for this trend to continue.

The carbonising of the raw wool, and of recirculated waste material which has an excessively high burr content, is likely to undergo little change in the near future. Although the total quantities of both these raw materials used in the woollen system will fall by the mid-1970's the proportion requiring carbonising is likely to rise slightly, due to the expected greater usage of South American wools, and some 20 per cent of raw material may well be treated in this way in the mid-1970's. No dramatic developments in machinery are envisaged at present although the recently introduced rotary-drum type of unit is likely gradually to supersede other types. There will be pressure for a higher level of shift operation when new plant is installed in place of obsolescent equipment, because of the significance of the capital charges for new plant. This is illustrated by the following figures for conversion costs of carbonising:

| | |
|---|---|
| *Operating cost:* | |
| All shifts | 3·0d per lb |
| *Capital charge:* | |
| 40 hours per week | 4·5d per lb |
| 160 hours per week | 1·1d per lb |

In blending, the almost universal adoption of semi-automatic or automatic techniques has already taken place. There should be very few hand blending units remaining in the future, and these will only handle extremely specialised lines. With the continued use of loose-stock dyeing, the blending of coloured and white fibres will still remain a key process in woollen material preparation, even though the total throughput of sorted raw material requiring blending will fall due to the increase in man-made fibre passing directly to the semi-worsted stream with little blending in the traditional sense.

Developments which are likely to be important in the future are associated with the use of multiple opener/bin systems which enable virtually continuous operation to be achieved. However, these are only economic when handling some 5 million lb per year with 'round the clock' operation. The conversion costs given on Figure 11.2(a) relate to a plant of this scale; they will vary a little depending on whether the blended material is blown directly to the cards or baled for transport to a separate carding shed. Similar data for a single opener/bin system would show an operating cost some 50 per cent higher, with broadly comparable capital charges throughout. Much of the labour is required for loading, cleaning out and general material handling, and thus the greater use of the multiple-unit systems in the future will have little effect on the quantity of labour required, although the pattern of shift-working will be modified as local conditions permit.



(a) Blending

(b) Carding

FIGURE 11.2 – COSTS OF WOOLLEN BLENDING AND CARDING

### 11.3 Woollen slubbing production

The process of carding on the woollen system is considerably more significant than on the worsted system, and it may be broadly equated to the whole sequence of operations from scouring to finisher-gilling, including combing, on the latter. A wide variety of types and sizes of woollen card exists; the traditional Yorkshire type of card has rather more individual swifts and intermediate feeds than the Continental types, and is reckoned to handle longer fibres more efficiently due to the greater depth of useful clothing. Figure 11.2(b) shows representative conversion costs for a reasonably high-performance carding system using a 50's crossbred wool, based on a shed of ten cards with a total throughput of some 500 lb per hour.

For a given class of product, there are clearly few advantages of multi-shift operation with existing equipment, although once the need for plant replacement occurs the pressure for multi-shift working becomes strong. As the rate of throughput is determined also by the class of product and the levelness of the slubbing required, the higher-performance units · should be used mainly on man-made fibre and good clean wools of relatively uniform fibre length. However, the larger batches and carding sheds will usually be associated with the bulk sections of the trade, such as the plain fabrics and carpet yarn areas, in which a higher level of shift operation will also be justified.

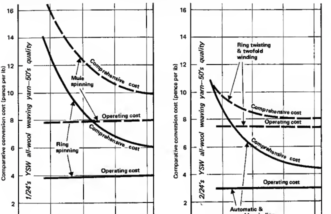
The pattern of carding activity in the woollen sector by the mid-1970's should thus be as shown in Table 11.2 at the end of the chapter. Little new capital investment will be required except for the replacement of the oldest plant, and in cases where the required output cannot be met by working the existing plant at an increased level of shift operation. Changes in manpower requirements should be small, due to the relatively small change in total output and the few improvements in efficiency resulting from the installation of new equipment.

### 11.4 Woollen spinning, twisting and winding

In woollen spinning both mule and ring spindles are currently used, with the emphasis being on ring spinning for the longer-run product areas. The most significant difference between the two methods is the output per spindle, which is some 6:1 in favour of the ring system; also the manning requirements for mule operation are over twice those for a similar yarn output from ring frames. Mule spinning, it is claimed, is superior for the finest counts. However, development activity in ring frames, especially overseas, is at least partly being devoted to matching the quality of mule output for the high-count woollen yarns. There have also been increases in the package size obtainable from ring frames, this being especially significant for the coarser yarns, when doffing frequency can be reduced. One factor of particular significance is the ability of the mule spinning system to cope with weaker, lower-quality yarns, and much of the skill of the United Kingdom woollen spinners in the past has been to produce an acceptable yarn using the cheapest raw materials available.

Thus, although the basic conversion costs shown in Figure 11.3(a) for a 1/12's Yorkshire Skein Weight (YSW) indicate that ring spinning is the more economic, even to the extent of justifying the replacement of existing mules by multi-shift ring frames, it is not suggested that there should be a complete swing to ring operation, as this would tend to remove much of the scope for raw material variation. The tendency should thus be for those specialist operators with reasonably modern mules to continue to operate them on whatever shift basis best suits their output requirements, the labour requirements of other parts of their organisation (if integrated), and the local social environment, whilst those establishments with obsolete mules, particularly in the woven carpet yarn or bulk weaving areas of the trade where larger batches are more likely to be available, should convert to ring frames and operate at a reasonably high shift level. The pattern of operation within the woollen spinning sector by the mid-1970's should be as shown in Table 11.2; the changes will not affect the total labour requirements to any great extent, but will increase the proportion of male workers to some 60 per cent by the mid-1970's, compared with 30 per cent at present.

The future of woollen twisting and winding is particularly difficult to assess, as the degree to which these ancillary operations are required depends largely on the fashion requirements of the final cloth in terms of yarn bulk, effect, and handling characteristics. A number of different winding and twisting methods are in use at present, the conversion costs of which are typified by those quoted for the ring (or singles) twisting and twofold winding in Figure 11.3(b). Recently-introduced systems, using the extremely rapid 2-for-1 twisting technique, have considerably reduced the operating cost of many twisting and winding operations, so that the installation of new plant is often justifiable even when operating at a relatively low shift level. The total operating cost of ring spinning followed by 2-for-1 twisting and winding is about half of that for mule spun and conventionally twisted yarn; this comparison is not untypical of a large number of yarn counts, and implies that there should be installation of further ring spinning and 2-for-1 twisting.



(a) Spinning (b) Twisting and winding

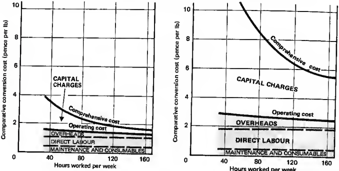
FIGURE 11.3 – COMPARATIVE COSTS IN WOOLLEN SPINNING AND TWISTING

### 11.5 Semi-worsted yarn production

The development of this process of yarn manufacture has taken place in line with the growth of the demand for yarn (largely of man-made fibre) for tufted carpets. The process consists essentially of simplified high-speed carding, several stages of gilling, followed by a form of apron-draft ring sliver to yarn spinning. At present, the spinning operation is confined to the production of relatively coarse-count yarns, because of the difficulties involved in producing a multi-zone drafting system capable of imposing drafts in excess of 30 on twistless slivers, as would be required for medium-count yarns of acceptable levelness for weaving.

The semi-worsted system produces an essentially lean yarn compared with woollen-spun yarns due to the degree of fibre parallelisation imposed during gilling; yarn packages are of up to 6 lb for the coarser counts, thus providing material in a relatively knot-free state for further processing.

As shown in Figure 11.4, the basic conversion costs of the semi-worsted processes are small when compared with woollen or worsted yarn production, and this is largely the result of the high throughputs achieved with the mainly man-made fibre material. The use of loftier material would tend to reduce the output of almost all the component processes in the system, and the sliver-yarn spinning techniques cannot easily be applied to less-regular or twisted sliver due to the relatively high drafts imposed during the spinning process.



(a) Carding (b) Spinning

FIGURE 11.4 – COSTS OF SEMI-WORSTED YARN PROOUCTION

The fact that much of the existing semi-worsted plant in the industry is fairly new, and is highly capital-intensive, has led already to a fairly high level of multi-shift operation. However, in order to minimise the amount of capital expenditure necessary to cope with the proposed increase of some 150 per cent output of semi-worsted yarns by the mid-1970's, it is probable that most plants will operate 'round the clock' in the future. Apart from detailed developments on the existing types of plant, it does not seem likely that new plant will be very different in concept to that being installed today, although, as discussed in the next article, the sizes of the individual machines may increase. The future level of semi-worsted activity in the mid-1970's should thus be as shown in Table 11.2 at the end of the chapter. As in the case of woollen twisting and winding, it is not possible to predict accurately the level to which twisting and winding will be required for the semi-worsted yarns of the future. Any new investment in this area should be in the most modern methods, typified by the 2-for-1 twisting with assembly and automatic winding as required, already discussed in the previous article.

## 11.6 The future of woollen and semi-worsted yarn production

The major change in the pattern of future activity in this sector during the next seven years will be the increase of some 150 per cent in the use of staple man-made fibre for semi-worsted carpet yarn production; the remaining activities will show little change in overall throughput, as shown on Figure 11.1. There should be a 10 per cent increase in output of woven-carpet yarns, and a decline of about the same magnitude in the output of woollen weaving yarns by the mid-1970's. The use of all raw materials except man-made fibres will decline marginally.

In terms of operational unit size, the information presented on Figure 11.5 shows the significance of the potential economies of scale for an integrated woollen spinner in the medium-count, run-of-the-mill trade. From this it is clear that any new establishments should only be considered at outputs of greater than some 1,600 lb per hour (8 million lb per year with 100 hours per week working). An existing operator could justify running a completely-written-down plant of only some 100 lb per hour, in which case multiple-shift operation would be only marginally cheaper than single shift. It must be noted, however, that these orders of magnitude are based on the use of sound and efficient management and administration, without which even the largest mills would fail to prove economic, and assume that no additional price advantage can be gained by virtue of the particular characteristics of the products of a specific operator. Similar data is given in Table 11.3 for other product groups, from which it is clear that full economies can be achieved at approximately the same mill size (around 1,600 lb per hour) for all classes of weaving yarn production. Viable units with an output of only some 50 lb per hour can be envisaged for the finer end of the trade. For blanket yarns the operations will need to be on a considerably larger scale, and full economies of scale are reached at outputs of around 2,500 lb per hour. Fully-written-down plants are viable with throughputs above some 400 lb per bour.

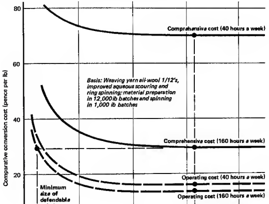


FIGURE 11.5 – ECONOMICS OF SCALE IN WOOLLEN YARN PRODUCTION

In semi-worsted yarn production, it has been estimated that even larger units (at least 3,000 lb per hour output) are required for maximum operational economy with new plant. Due to the high capital cost of plant, economic operation with existing plant (neglecting capital charges) can be achieved with an output of only some 150 lb per hour.

All the quoted operating economies have been derived assuming minimum batcb sizes as shown below:

| | *Raw material preparation* | *Spinning and twisting* |
|---|---|---|
| Fine weaving yarns | 10,000 lb | 500 lb |
| Medium count weaving yarns | 12,000 lb | 1,000 lb |
| Blanket and woven carpet yarns | 13,000 lb | 2,000 lb |
| Semi-worsted yarns | 18,000 lb | 10,000 lb |

Operation with smaller average batch sizes will result in higher conversion costs, as given in Figure 11.6, and in general plant sizes for the most economic operation would be correspondingly reduced for smaller average batches.

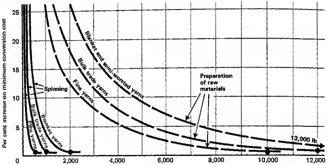


FIGURE 11.6 – ECONOMICS OF BATCH SIZE IN WOOLLEN YARN PRODUCTION

There is little justification for the setting-up of new plants with new buildings, even taking into consideration the plant and building grants available in Development Areas, except in the case of semi-worsted yarn production. By siting in a Development Area it is unlikely that excessive transport costs will be incurred, as tufted carpets are produced in a variety of locations. It is recommended, therefore, that any new semi-worsted mills should be sited in Development Areas.

The pattern of future changes within the woollen and semi-worsted yarn-producing activities is shown in Tables 11.1 and 11.2, in which the requirements in terms of the improved aqueous scouring equipment, high-performance woollen cards, mules and ring frames, and semi-worsted plant are given. Table 11.3 shows the recommended sizes of operating unit as previously discussed for efficient working with new or written-down plant.

In the long-term, it is likely that there will tend to be more drastic changes in the spinning area than in the preparation of the raw materials up to the carded sliver stage. This is due partly to the potential economic advantages of radically new yarn systems such as break spinning, and the fact that alternative methods of fabric manufacture, such as the stitch bonded and bonded web types, use unspun carded fibres; they will thus still require relatively conventional raw material preparation even though the traditional forms of spinning activity may be eliminated. Although it has been predicted that these factors are not likely to be of major significance by the mid-1970's, they will undoubtedly be of relevance for the future beyond this time.

Table 11.1 – Output of woollen and semi-worsted yarns in the mid-1970's

| Product | *Output in mid-1970's (m lb per year)* | *Operating hours per week* | *Typical batch size (lb)* | |
|---|---|---|---|---|
| | | | *Preparation* | *Spinning* |
| Fine weaving yarns | 36 | 60-100 | 10,000 | 600 |
| Bulk trade weaving yarns | 112 | 80-120 | 12,000 | 1,000 |
| Blanket and woven carpet yarns | 68 | 80-160 | 13,000 | 2,000 |
| Semi-worsted tufted carpet yarns | 37 | 140-160 | 15,000 | |

**Table 11.2 – Woollen and semi-worsted yarn production plant in the mid-1970's**

| Type of plant | Output in mid-1970's (m lb per year) | Average hours per week | Number of sets or spindles | | | |
|---|---|---|---|---|---|---|
| | | | *TOTAL required* | *Existing* | *To be purchased* | *To be scrapped* |
| *Scouring:* | | | | | | |
| Conventional | 51 | 80 | 41 | 85 | – | 44 |
| Improved aqueous | 40 | 130 | 4 | – | 4 | – |
| *Woollen carding:* | 224 | 90 | 1,880 | 2,630 | 100 | 850 |
| *Woollen spinning:* | | | | | | |
| Mule | 115 | 80 | 0·67 m | 1·24 m | 0·01 m | 0·58 m |
| Ring | 101 | 120 | 0·07 m | 0·14 m | 0·02 m | 0·09 m |
| *Semi-worsted carding and gilling:* | 37 | 150 | 65 | 42 | 23 | – |
| *Sliver-yarn spinning:* | 37 | 150 | 9,100 | 9,100 | – | – |

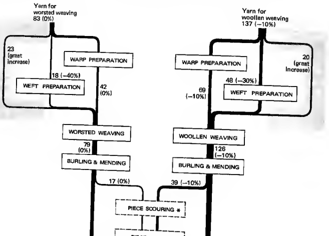
**Table 11.3 – Mill size in woollen and semi-worsted yarn production**

| Product | Mill size (lb per hour) | | Average operating hours per week | Mill size (m lb per year) | |
|---|---|---|---|---|---|
| | *For full economies* | *Defendable existing* | | *For full economies* | *Defendable existing* |
| Fine weaving yarns | 1,600 | 50 | 80 | 6·4 | 0·2 |
| Bulk trade weaving yarns | 1,600 | 100 | 100 | 8·0 | 0·5 |
| Blanket and woven carpet yarns | 2,500 | 400 | 120 | 15·0 | 2·4 |
| Semi-worsted tufted carpet yarns | 3,000 | 150 | 150 | 22·5 | 1·1 |

# Chapter 12 Fabric manufacture and finishing

## 12.1 Fabric manufacturing processes

For the purposes of this chapter, the fabric manufacturing process for both worsteds and woollens comprises all activities between receipt of yarn (whether on cheese, cone or beam) and inspection of the finished fabric prior to dispatch. The main component processes are, therefore, warp and weft preparation, weaving, burling and mending, finishing, and finish mending and inspection. Figure 12.1 shows the expected flow through these processes in the mid-1970's, based on the forecasts of output given in Chapter 8, the major changes from the present being a 10 per cent reduction in output of woollen fabric, and a 40 per cent reduction in weft preparation, for reasons described later in the chapter.



Numbers give mid-1970's flows in million lb per year. Percentages give change from present flows

* Processes connected with dyeing are discussed in Chapter 13

Expanding areas as shown in red

FIGURE 12.1 – PROCESS ROUTES FOR MANUFACTURING FABRICS

Opportunities exist for the industry to more than compensate for the reduction in woollen fabric output by substantially increasing its interests in weft and modified warp knitting. As shown in Figure 8.3, it is proposed that the output of weft knitting within the industry should rise from less than 1 m lb at present to some 24 m lb by 1975, this being some 30 per cent of the total increase in United Kingdom demand forecast for this product. In modified warp knitting, a total demand of some 8 m lb is tentatively forecast for the mid-1970's, the bulk of which should be supplied from the industry.

Although Figure 12.1 shows continuous flows of materials, only the bigger integrated worsted firms carry out all the operations shown. Whilst commission warpers, beamers, and weavers are not insignificant in terms of proportion of total output of the sector, commission finishing presently processes some 30 per cent of the total, as described in Chapter 1. In a sense, finishing is the most important activity in the whole wool textile industry, since expert finishing can improve the customer appeal of an average product, whilst bad finishing will ruin a well-woven cloth produced from the best materials.

In terms of total conversion cost from raw material to finished fabric, the processes of weaving and finishing are extremely significant, contributing 20-50 per cent and 5-20 per cent respectively. In general, the finer cloths, both woollen and worsted, require the most effort in weaving, due to the lower speed of fabric production resulting from the finer yarn count, and to the higher standards required of the completed cloth. For example, in a representative fine Huddersfield men's suiting cloth, some 65 per cent of the total conversion cost from fleece to finished fabric can be accounted for by weaving and finishing, the individual contributions from weaving (including preparation), mending and finishing being some 32, 18 and 15 per cent respectively. The same activities contribute some 55 per cent of total conversion cost for a typical bulk trade worsted cloth, the individual proportions being 25, 12 and 18 per cent for weaving, mending and finishing respectively. A similar pattern exists with woollen cloths, although at the lower priced end of the trade, mending is virtually eliminated.

## 12.2 Warp and weft preparation

The processes of warp and weft preparation are to a great extent subsidiary to the main activity of the sector, and seldom account for more than 5 per cent of the total conversion cost of the weaving process. Nevertheless, as discussed in Chapter 14, they are significant in terms of the quality and quantity of yarn stocks held prior to fabric manufacture, and also affect the efficiency of weaving, hence partly determining the mending necessary.

A sizeable part of the current warping and beaming activity is at present carried out by the spinner, although it is suggested that this should be part of the normal manufacturing function, as the stocking and transporting of beams, loaded or empty, is then restricted to one establishment and the overall value of the stock concerned thus minimised. Rationalisation of the vast variety of sizes and types of beams would also be facilitated. Primarily, though, the close relationship between warping and loom efficiency suggest that this should be the manufacturer's responsibility. The only cases where the worsted spinner might justifiably retain this function would be where the yarn was being sent to a commission weaver not equipped for warping, as is the norm at present among commission manufacturers, or where the spinner felt able to install particularly efficient plant (such as 'slasher' warping) for very long runs. But in these cases the spinner should ensure that he charges a reasonable price for the service.

The two-stage process of warping and beaming is likely to continue in the future, in order to avoid the problems of holding a very large number of yarn cones, and of controlling the run-off from a multiple-yarn input of considerable variety. The use of wide-flange beams is likely to rise as the demand for larger package sizes (i.e. cuts per warp) increases, although the present standard limit of 30 inches flange diameter seems unlikely to be superseded in the next seven years. The actual cost of warping and beaming depends largely on the length of the yarn on each warp; however, in view of the dominance of the weaving (or warp knitting) activity in terms of conversion cost, it is not likely that an optimisation on warping alone would be carried out, except perhaps by commission warpers, whose overheads and capital charges would have to be covered by this operation alone. Typical operating costs, including overheads and capital charges, are around 0·5d per lb for bulk orders, rising to perhaps ten times this amount for the finest yarns where the demand is for relatively small warp lengths. In general, the industry's heritage of warp preparation plant is adequate to cope with the likely demand of the next seven years, even including the additional warping involved for the proposed modified warp knitting activity. The level of shift working is unimportant in terms of warping costs when written-down plant is used. Reductions of up to 3d per lb for fine yarns can be achieved by 'round the clock' working, but it is most unlikely that any operator would find this attractive unless his whole manufacturing unit was operating a similar multi-shift system.

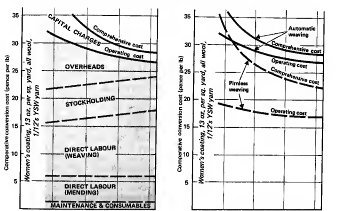
Although by the mid-1970's the majority of looms will still have shuttles, there should be a marked decline in weft preparation, due to the increasing use of pirnless looms. The fact that the quantity of cloth woven on pirnless machines should rise from an annual rate of some 14 million lb at present to about six times this level by the mid-1970's will lead to a corresponding reduction in the use of weft preparation plant; this trend will be exacerbated by the proposed major expansion into weft knitting, for which the yarn input to the knitting machines is direct from the yarn cone package.

The conversion costs of pirn winding are normally less than 1d per lb, even with new plant on high-count yarns; thus pirn winding has a very small influence on the overall economics of fabric production, except that, like warping, its standard is closely related to loom efficiency, and poor pirn winding will increase the number of rejects or 'seconds'. This too should, therefore, be the responsibility of the weaver.

## 12.3 Weaving

Although woollen and worsted weaving are carried out in separate establishments, apart from the relatively few horizontally-integrated manufacturing establishments referred to in Chapter 4, the basic machinery types are, and will continue to be, broadly similar, though with different emphasis for particular types of woollen and worsted product. The four major types of loom each have significant advantages for specific cloth requirements. The non-automatic is the most flexible, and with universal odd-and-even picking can weave virtually any type of cloth with up to seven colours arranged at will. Operation is slow, at around 100 picks per minute for standard medium weight cloths, with one operative typically handling only one or two looms. The automatic loom, which has automatic weft replenishment and exhaustion detection, can normally only weave up to four colours, though some modern looms can accept six for limited types of weave. Picking is odd or even only, and speeds of operations are around 100-120 picks per minute for standard medium weight cloths, with the number of looms per operative varying from two to eight depending on the type and variety of the cloth. Semi-automatic looms are effectively intermediate between the non and automatic types in flexibility and speed of operation. The pirnless types, which vary widely in mechanical detail, are in general considerably more complex and expensive than the conventional looms, but provide very rapid picking rates of up to 250 (bullet or rapier type) or even 350 (airjet) picks per minute for relatively simple weaves. There are, however, colour limitations at these high operating speeds, and very uniform and strong yarns are required. The number of looms per operative is normally higher than for automatics; eight looms per weaver is usual in worsted weaving in the United Kingdom, although abroad up to twenty is not unknown. The performance of these pirnless weaving machines in terms of yarn breakage is claimed to be superior to the normal automatics, although there are undoubtedly some cloths which cannot be woven satisfactorily on certain pirnless machines due to the very high yarn stresses. The selection of the correct loom type will thus depend critically on the type and variety of the cloths to be produced.

A representative comparison is given on Figure 12.2 between the operating and conversion costs (see Definitions and Assumptions) for manufacturing and mending a typical ladies' woollen coating using automatic and pirnless weaving techniques. The lower operating and comprehensive costs of the latter method, particularly at higher levels of shift operation, are due to the lower total labour cost, resulting from the greater output per machine, the smaller proportion of weaving faults for a given yarn, and the lower cost for the materials tied up as work in progress on the machine. This work in progress material is mainly warp yarns, which must be held on the loom for a considerable period with large numbers of cuts per warp. The comparative process economics quoted on Figure 12.2 are for a weaving batch of some 10 cuts per warp; the operating costs of pirnless weaving would rise by some 5 per cent for batch sizes of half this amount, although the automatic looms would remain at full economies of scale as shown on Figure 12.3. Further reductions in batch size would lead to more significant rises in operating cost for both processes, and the pirnless weaving would tend to become very much less attractive when operating with a small number of cuts per warp. The data given on Figure 12.3 shows, for each type of weaving, the typical operating cost penalties for batch sizes smaller than the optimum, which varies with the type of plant used. While there are likely to be improvements in the operating economies of both automatic and pirnless looms resulting from new developments over the next few years, it is unlikely that the broad comparisons shown in Figure 12.2 will be significantly altered.



(a) Automatic weaving

(b) Cost comparisons

FIGURE 12.2 – COMPARATIVE WEAVING COSTS

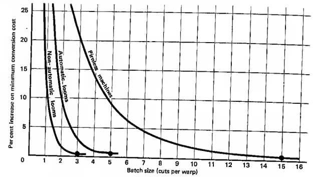


FIGURE 12.3 – ECONOMICS OF BATCH SIZE IN WEAVING

The question of the optimum width of finished cloth to be woven is being investigated by a number of weaving machinery makers at the present time, and it is likely that the advantages of using looms wider than the present standard (a 56 to 60 inches finished cloth width) for much of the cloth produced will prove highly attractive. It is vital, however, that developments in this field be co-ordinated with advances in cloth-cutting methods being investigated by clothing producers who, for example, currently favour a 60-inch finished cloth width for entailing least waste. If the cloth buyer can be persuaded to accept cut widths (which will have to be satisfactorily finished without undue edge variation), and sufficiently long weaving runs in terms of double width cuts per warp can be maintained, it is likely that a sizeable proportion of the new equipment installed for the bulk trade will be of 'double width'. The attractiveness of purchasing new wide weaving machines depends to a great extent, however, on how the plant makers fix the price ranges for units of various operating widths. Today, some price ranges represent a virtually-constant capital cost per inch width of bed, whilst others show a marked decrease in capital cost per inch as the bed width rises. Since wider machinery offers definite economies for the machinery manufacturer, there will be pressure on those manufacturers offering the wider machines at an unreasonably high price to become more competitive.

In terms of product group, it is recommended that the worsted trade tend to divide into two broad types of operation in the future. The fine and specialist producers should continue to use the non-automatic, semi-automatic or automatic types of loom, with the level of manual operation depending on variety and colour requirements. In the bulk trade, there are great incentives to install new pirnless units operated on a multi-shift basis, such operation being more economic even than continuing with existing automatic looms. The woollen trade should follow a relatively similar pattern, although there should be a less-significant swing to the use of the pirnless machines. This will be due partly to the rather smaller proportion of the trade for which the larger-order batches can be regularly achieved, and partly to the problems associated with the higher woollen yarn stresses encountered on the shuttleless units. As in the worsted trade, the operation of the conventional looms should remain at around 50 hours per week, there being relatively small additional economies to be gained from higher levels of shift working with existing plant. The operators with new pirnless machines of all types will again find multi-shift operation an attractive proposition in terms of improved process economics.

The future pattern of activity in manufacturing is summarised in Tables 12.1 to 12.3 at the end of this chapter. The impact on the labour requirements in both woollen and worsted manufacturing in the mid-1970's will be significant. Thirty per cent fewer workers will be required than at present, but because of the higher level of shift working in the pirnless mills, the proportion of men required will increase from the present 35 per cent to about 60 per cent.

## 12.4 Knitting

Of the other fabric manufacturing processes available at present, knitting is the most important. The past and expected future shares of total textile fabric production held by knitting and weaving are as shown below:

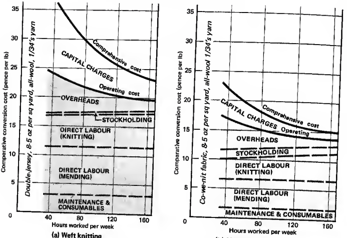
| | *Percent of total United Kingdom output* | | |
|---|---|---|---|
| *Process* | *Mid-1950's* | *Mid-1960's* | *Mid-1970's* |
| Weaving | 72 | 59 | 34 |
| Weft knitting | 22 | 25 | 33 |
| Warp knitting | 6 | 16 | 33 |

These figures are not limited to markets or fibres currently within the scope of the wool textile industry, but are useful as an indication of the basic shifts anticipated in the total textile field.

Although the relevant sectors of the hosiery trade are themselves expanding, there are several basic reasons why the wool textile industry is in a strong position to capture at least part of the predicted increases in demand. In terms of production techniques, the wool textile industry supplies a significant part of the yarn used by the weft knitting sector, is well acquainted with the overall problems of designing, producing, handling and stocking fabric, and is particularly strong in the field of fabric finishing. Furthermore, the industry has experience and contacts within the potential market areas for much of this additional knitted material.

In the weft knitting field, the area most akin to the woven cloth trade is that concerned with the manufacture of double-jersey fabric, and this is probably the activity best suited to the wool textile industry, in spite of its high consumption of filament yarns forecast in Chapter 6. There will also be an increasing interest within the hosiery trade in the greater use of fully-fashioned garment techniques, which are expected to use a higher proportion of spun yarns than the jersey fabrics; although further removed from the industry's current activities, it is, therefore, equally appropriate to recommend knitwear as a fruitful area of diversification for the industry. By the mid-1970's, it will have become clear whether the fully-fashioned knitting machine makers have achieved the anticipated break-through in terms of patterning scope and increased throughput. If, as is hoped, full Jacquard capability can then be employed on a high-speed fully-fashioned machine, the wool textile industry should then consider this as a particularly attractive area for investment.

Representative conversion costs for a typical weft knitted fabric are given in Figure 12.4 (a), the build-up of costs being comparable with that of the worsted cloth shown in Figure 12.2. There are considerable advantages in operating new knitting plant on a multi-shift basis, and the knitting units set up should be run 'round the clock' as far as possible. As stated previously, in our opinion the industry should be able to capture some one-third of the anticipated growth in demand for apparel fabrics of the double-jersey type over the next seven years (implying an annual production of some 24 million lb per year by 1975), provided the opportunity is not lost to Leicestershire, Lancashire or Northern Ireland.



(a) Weft knitting

(b) Modified warp knitting

FIGURE 12.4 – COSTS OF KNITTING

The pattern of future activity in warp knitting is rather different in that only a small part of the output from this sector is in any sense competitive with wool textile products. Fabrics which will compete directly with woven cloth have been developed, however, using modified types of warp knitting, in which the basic warp thread pattern has yarn inserted using relatively unstressed threads which may be either warp or weft in character. Typified by the Co-we-nit machine, the production units produce a fabric which is intermediate between a woven and a knitted structure, giving new scope for fabric design, finish and handle. The basic economics of these machines are attractive, and the typical conversion cost data given on Figure 12.4 (b) shows that, in general, the Co-we-nit fabrics can be produced for a slightly lower cost than the nearest weft knitted equivalent. These fabrics are, nevertheless, in their infancy, and although operators currently in conventional warp or weft knitting will also be interested, there is no reason why the wool textile industry should not be actively engaged in this field. Over the next seven years, assuming the economics and customer appeal of modified warp knitted fabrics have been proven, the industry should build up an annual output of some 8 million lb of modified warp knitted fabric, produced on newly-installed plant, which will of necessity have to be operated virtually 'round the clock'.

## 12.5 Production of other fabrics

During the course of the study, a wide-ranging investigation was carried out into a number of alternative methods of fabric manufacture which might prove of significant interest to the wool textile industry by the mid-1970's. Apart from the two types of knitting discussed in Article 12.4, none of these other techniques would seem to merit further serious investigation on an industry-wide basis. However, there are several areas of activity in which future developments could detract from the industry's future markets. These were discussed briefly in Article 6.4 in product terms, and for completeness are reviewed in this article in production terms.

*Stitch bonding*

A great deal of activity, largely in Eastern Europe, has led to the development of a number of types of machine in which a fabric is formed by linking the fibres of a carded web, a number of overlaid webs, or a bed of unattached warp and weft threads, by means of a separate stitching thread progressing in a warpwise direction along the machine bed. These processes are essentially for very high production runs of relatively cheap fabric with very limited scope for patterning or thread changes. It is claimed that current international capacity of stitch bonding units exceeds 150 million square yards per year, but little impact has been made on the world textile market to date outside certain restricted areas such as in Eastern Europe. There are a few machines in this country at present, but there seems little reason to expect the current low level of interest to expand significantly over the next seven years.

*Needle punching*

This is a very simple process, in which a fabric is formed by looping adjacent fibres in a previously-prepared web by means of an oscillating bed of open-ended needles. It is at present restricted in applications to end uses, such as blankets, which are largely manufactured from non-wool fibres. Although there is a measure of competition with woven or knitted blanket manufacturers, this is only at the lowest quality end of the trade, and it is likely that the bulk and upper end of this particular market will remain with conventionally-woven or knitted fabrics.

*Adhesive bonding and lamination*

Although much of the interlining material produced by the wool textile industry in the past was adhesively bonded, largely by the clothing trade, this particular market has largely been taken over by various types of fusible material, based mainly on non-animal fibres. There is, however, a justification for the industry to take some interest in the various processes of cloth lamination typified by the 'coin' and 'minifoam' techniques at present widely used. Rather than provide an alternative means of making a basic fabric, these techniques enable combination effects to meet specific requirements of appearance, fabric strength and stability and wear resistance, and are of considerable potential value in the fashion trades.

*Slit-film fabrics*

There are several recently-developed methods by which a relatively simple integrated plant can be set up to produce slit fibres from polymer chips, normally of polypropylene or high-density polyethylene. End products such as ropes and twines are currently made in this way, and in the USA a market for 'slit-knitted' fabrics for use as automobile or industrial upholstery, in addition to the weaving of industrial sack cloths, has been established. It is not anticipated that the markets for such products will be significant in the United Kingdom during the next seven years.

*Paper-type fabrics*

Paper-making processes basically utilise the water-solvent bond characteristics of certain cellulose fibres. Although in the very long term clothing may be produced by processes of this type, it does not seem likely that there will be significant progress in the field of fabrics competing with the products of the wool textile industry. The level of interest on the part of the industry as a whole should continue to be on a general research basis.

*Bicomponent and melded fibres*

Various techniques for fabric production based on the melting and welding of certain man-made fibres have been developed in recent years. They have, as yet, made little impact on the markets for wool textile products, but as this is a field in which several of the larger fibre producers are known to be investing a good deal of development activity, there is at least a likelihood that fabrics made by some form of these processes will find significant application for particular end uses in the future.

### *Potential trends in development*

Most of the advances and innovations in methods of textile production in recent years have occurred abroad particularly as a result of effort of man-made fibre producers or machinery makers. A possible pointer to future trends is the acquisition of the Draper Corporation and of the Textile Machine Works, both of them massive American producers of textile plant, by the Aerospace and Systems Group of North American Rockwell, the largest of the US space contracting companies. These diversification moves are part of an attempt to revolutionise methods of textile production by converting it into a fully-automated integrated process from fibre reception to finished cloth. While such developments are both theoretical as yet and most likely to affect cotton-type textile production first, it is essential that the wool textile industry appreciates the rapid changes occurring in its environment, and seizes all available development and investment opportunities before they are taken up by companies or industries not necessarily better suited to the processes but more aggressive and adventurous in their business approach.

## 12.6 Burling and mending

The activities of burling and mending are significant in that they contribute up to some 10 per cent of the total conversion costs of all the products of the wool textile industry, and it is at least partly on the standard and degree of the mending carried out by the industry that the general reputation for reliability and quality has been built up in the past. In general, there is a higher level of mending carried out on worsted cloths, as shown below, although for certain of the finer specialist woollen cloths the standard required by the market is sufficiently high to call for an equally meticulous level of mending.

*Mending cost (per cent of comprehensive conversion cost)*

| *Worsted* | | *Woollen* | | |
|---|---|---|---|---|
| *Fine trade* | *Bulk trade* | *Fine trade* | *Fancy trade* | *Blanket fabric* |
| 12-18 | 7-12 | 5-8 | 4-7 | 2-3 |

A proportion of the mending activity is carried out after the finishing processes have been completed, especially for the higher quality and finer cloths where the techniques of masking faults by certain forms of cloth face finishing, well justified in run-of-the-mill material, would not be acceptable.

These activities, which currently employ over 21,000 women, are likely to be even more significant in the future in terms of conversion cost, as they are almost entirely labour-intensive. Some attempts have been made to reduce the costs of mending by rigorous work and method study, but it has been estimated that a reduction of only some 10 per cent of current average costs could be obtained, even with a highly trained and efficiently working group. On balance, therefore, taking into account the additional costs of training and supervision, and the need to offer incentives to offset the poor image of burling, it is unlikely that any significant improvements can in fact be achieved on a large scale by concentrating on the burling or mending operations themselves.

On the other hand, the inter-firm comparison of Huddersfield fine worsted producers highlighted the effect of these operations on companies' productivity, and indicated the importance of decreasing the effort required on them. The best course of action, therefore, for the industry is to endeavour to reduce the sources of these costly faults. To this end, the higher standards of weaving resulting from the use of pirnless or improved-design automatics are likely to assist in the future. The fact that upwards of 30 per cent of all weaving faults can then be attributed to yarn and twist faults means that special care must also be exercised in achieving the correct balance of yarn quality and cost for a particular cloth, and underlines the case for installing the most efficient spinning, twisting, warping and other plant.

It is anticipated that the total labour requirements for all forms of mending activity will be reduced by some 25 per cent over the next seven years, in view of the introduction of pirnless weaving and the marginal fall in overall demand for woollen cloth. Allowance has been made in the above figure for some degree of mending of weft and modified warp knitted fabric.

### 12.7 Finishing

The United Kingdom leads the world in cloth finishing, and every use should be made of this advantageous position in the future. As the various finishing processes become more highly-developed, the ability of the cloth finisher is becoming ever more important, and it is often in his hands to make or mar the fabric, especially in sections of the trade where a premium is obtainable for overall handle, appearance and performance rather than for a specified traditional product. The highest proportion of the total cloth conversion cost is devoted to finishing in the bulk parts of the apparel trade, as shown below.

*Finishing cost (per cent of comprehensive conversion cost)*

| *Worsted* | | *Woollen* | | |
|---|---|---|---|---|
| *Fine trade* | *Bulk trade* | *Fine trade* | *Fancy trade* | *Blanket cloths* |
| 12-18 | 15-20 | 5-8 | 10-15 | 7-10 |

The vast range of finishing processes used at present basically fulfils three functions:

(a) the removal of impurities such as grease and dirt accumulated during processing;
(b) the correction of the structure of the fabric, thus regularising its performance;
(c) the imparting of the required surface effects and overall characteristics.

The current trends of development of the wool textile industry as a whole will tend, in the long-term, to reduce the need for the first two functions, due to the gradual improvement in the standards of overall cleanliness throughout all stages of processing and the improvement in performance of the later activities, such as spinning, twisting and weaving in particular. The need for more and more specific 'finishes' such as crease retention and resistance, washability, drip-dry capability, rain, grease and dirt repulsion, in addition to particular properties of drape, wear and surface appearance, is likely, however, to increase in the future, and it is most probable that, on balance, finishing will be of even greater significance by the mid-1970's.

The commission finishers, as opposed to the finishing departments of integrated mills, are likely to become of even greater significance in the years ahead, provided that they are able to secure a sufficiently large portion of the market to enable them to maintain operation at a higher level of shift working than at present, without a corresponding fall in plant utilisation. At present, much of the finishing in the industry is carried out on a single day-shift basis, with the commission units tending to work slightly longer hours. If the sector accepts the opportunity of finishing the additional 32 m lb per year of knitted fabric which it is proposed that the industry produces by the mid-1970's, and also attracts a measure of the finishing requirements from the growing hosiery trade, there will be a demand for a marked increase in capacity which could best be met by commission units operating more shifts. They would, in any case, be in the best position to accept the rather different types of work associated with knitted fabrics, as their entire capital can be devoted to introducing the most appropriate plant for the job as quickly as possible.

Apart from overall developments in the technical services offered by the finishers of the industry, there are undoubtedly a number of improvements which can be made within individual operating establishments by way of streamlining the control and administration of the highly complex production scheduling required in order to make the most efficient use of the facilities. By its very nature there will always be finishing plant not fully utilised, and the current average level of plant utilisation in the industry, at about 75 per cent, does not seem unduly low, and is indeed possibly higher than might be expected for a fashion industry.

### 12.8 The future of fabric manufacture and finishing

The overall pattern of future activity in this sector should involve considerable change in the balance of non-automatic, semi-automatic, automatic and pirnless machinery, although the overall throughput of the sector should only rise by some seven per cent over the next seven years, even including the additional knitted fabric output recommended earlier in the report. Tables 12.1 and 12.2 summarise the basic patterns of production recommended for the mid-1970's.

In the long term, the development of very-high-speed automatic machines, such as those employing wave shedding mechanisms, will tend to ensure a balance between looms with shuttles and pirnless types, even for bulk trade weaving, although it is unlikely that the proportion of pirnless machines will ever fall below that predicted for the mid-1970's.

Figure 12.5 shows typical economies of scale for a bulk trade worsted weaving establishment, operating with new and written-down plant, for a range of levels of shift working. As for previous processes, two particular sizes of establishment are significant, and are shown on the diagram. The size at which reasonably full economies of scale, for all types of operation, can be achieved is in this case around 800 lb per hour. The size below which it will be less economic to operate with existing plant than with new plant at full economies of scale, that is, the minimum viable size of production unit, is some 200 lb per hour, assuming, as before, that no additional price premium can be obtained for the speciality or fashion characteristics of the fabric produced. The establishment sizes for units producing other classes of woollen and worsted cloth have been determined in a similar manner, and the outputs relating to full economies of scale and minimum viable size for standard products are given in Table 12.3. The expansion into knitting will involve the setting up of a number of establishments, each producing some 250 lb per hour at least for warp knitting, and some 500 lb per hour for weft knitting in the bulk fabric sector.

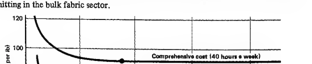


FIGURE 12.5 – ECONOMICS OF SCALE IN MANUFACTURING

The only sectors in which a consideration of the use of new buildings, or the movement into a development area, is justified, are the additional investments in pirnless weaving for the high-output, run-of-the-mill woollen and worsted trades, and in the fields of both weft and modified warp knitting. The decision to move into a Development Area must clearly take into account such additional factors as the availability and training of labour and management, the transport of raw material and finished product, and the overall control of an establishment by a parent company in its existing location; it would undoubtedly be far better for such developments by the industry were quasi-Development Area grants available to it, on an industry basis, in its present locations.

In finishing, the pattern of change is very much less specific, for although there should be a reduction in the demand for standard cloth finishing, there will be scope for expansion in the field of knitted fabric finishing. Since many of the major finishing processes are capital-intensive, operation in a Development Area proves attractive if extra capacity is planned.

**Table 12.1 – Output of fabric in the mid-1970's**

| *Product* | *Output in mid-1970's (m lb per year)* | *Operating hours per week* | *Typical batch size (cuts per warp)* |
|---|---|---|---|
| Fine worsted fabrics | 19 | 50 | 3 |
| Bulk worsted fabrics | 60 | 50-120 | 10 |
| Fine woollen fabrics | 26 | 50 | 3 |
| Fancy woollen fabrics | 90 | 50-120 | 8 |
| Blankets | 10 | 50-120 | 15 |
| Weft knitted fabric | 24 | 160 | 10* |
| Modified warp knitted fabrics | 8 | 160 | 5* |

*Equivalent batch size

**Table 12.2 – Fabric production plant in the mid-1970's**

| *Type of plant* | *Output in mid-1970's (m lb per year)* | *Average hours per week* | *Number of looms or machines* | | | |
|---|---|---|---|---|---|---|
| | | | *TOTAL required* | *Existing* | *To be purchased* | *To be scrapped* |
| *Worsted weaving:* | | | | | | |
| Non-automatic<br>Semi-automatic | 11 | 50 | 2,200 | 8,800 | Few | 6,600 |
| Automatic | 22 | 50 | 4,200 | 5,500 | 400 | 1,700 |
| Pirnless | 46 | 120 | 1,250 | 300 | 950 | – |
| *Woollen weaving:* | | | | | | |
| Non-automatic<br>Semi-automatic | 34 | 50 | 5,200 | 12,700 | Few | 7,500 |
| Automatic | 52 | 50 | 8,200 | 7,400 | 1,300 | 500 |
| Pirnless | 40 | 120 | 1,130 | 400 | 730 | – |
| *Weft knitting:* | 24 | 160 | 200 | – | 200 | – |
| *Modified warp knitting:* | 8 | 160 | 80 | – | 80 | – |

Table 12.3 – Mill size in fabric production

| | *Mill size (lb per hour)* | | *Average operating* | *Mill size (m lb per year)* | |
|---|---|---|---|---|---|
| *Product* | *For full economies* | *Defendable existing* | *hours per week* | *For full economies* | *Defendable existing* |
| Fine worsted fabrics | 160 | 75 | 50 | 0·4 | 0·2 |
| Bulk worsted fabrics | 800 | 200 | 90 | 4·8 | 1·2 |
| Fine woollen fabrics | 500 | 100 | 50 | 1·2 | 0·2 |
| Fancy woollen fabrics | 800 | 150 | 90 | 4·2 | 0·8 |
| Blankets | 800 | 400 | 90 | 5·4 | 2·7 |
| Weft knitted fabrics | 500 | – | 160 | 4·0 | – |
| Modified warp knitted fabrics | 250 | – | 160 | 2·0 | – |

# Chapter 13 Colouration

## 13.1 Processes for dyeing

The present status of the various techniques for dyeing were briefly discussed in Article 1.10, in which the various stages at which dyeing can take place were outlined, together with the current output. In general, there seems little evidence that, in future, there will be any completely new locations at which a significant quantity of material will be dyed, although there will undoubtedly be notable changes of emphasis between the various methods now in use.

One of the dominant factors in assessing the future pattern of dyeing methods is the advantages of high-temperature autoclave dyeing, which permits the dyeing process to be carried out much more rapidly. High-temperature dyeing is necessary for synthetic fibres, and it also affords a much better degree of environmental control than normal-temperature dyeing. This means that there should be little justification for investment in normal-temperature equipment in the future, as consumption of man-made fibres is expected to increase significantly. The trend towards high-temperature equipment will not only be due to its flexibility in terms of types of fibre which can be handled, but also to the fact that standardised dye vessels are being developed which can cope with materials in various forms (i.e. stock, tops or yarn) in tbe same vessel by supporting the material on different carriers. This will lead to a great measure of flexibility in individual dye-houses, and should enable a better utilisation of dyeing capacity to be achieved in future even though the ancillary processes are different for the various forms of material.

In all dyeing processes, the average lot size is extremely critical in maintaining an acceptable level of conversion cost, and this is discussed in detail, for each of the individual activities, in later articles. In general, there will be a range of dye lot sizes (up to the full capacity of the vessels), which can be satisfactorily dyed either by under-utilising the plant (which is usually the more economic), or by running continuously with vessels not filled. Below this economic lot size for a given vessel, investment in a set of vessels of the next-smallest standard size would need to be considered. It is thus advantageous to operate witb the largest vessel sizes for which a high level of utilisation witb near full capacity can be obtained, although for most dyehouses, a balanced set of vessels of varying size to cover economically the likely range of lot sizes to be handled would be installed. It is of interest to note that recent developments have enabled a recirculating liquor technique to be adopted, in which a pair of identical vessels can be cross-linked by a pipe system to operate effectively as a single 'lot' unit of twice the individual vessel capacity.

One of the major problems of the dyeing sector is that of colour-matching. The extremely high standard of colour-matching is at least partly responsible for the enviable reputation of British cloths, and certainly for the fine worsteds involving mixture shades such high standards should be maintained. However, there is evidence that, for the bulk trades at least, too high a standard is being set. To the ultimate customer, the purported multiple shades of black are meaningless, and even to the professional the differences must be minute. Such ultra-high standards only add to costs and time delays, without any benefit whatsoever. Much of this wasteful effort could be eliminated if colour-matching procedures (both devices and conditions under which matching is to be done) could be agreed between dyers and their customers, thus removing at least some of the subjective elements and personal foibles which currently often appear to control shade acceptance. Acceptance should be based at least as much on business considerations as on levels of artistry.

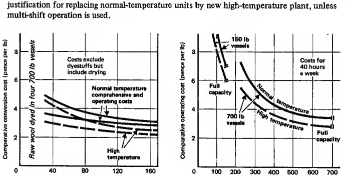
Numerous developments are currently taking place in dyeing, of which the most significant are the semi-continuous loose-stock dyeing of large lots, carded sliver dyeing instead of ball top dyeing (thus eliminating recombing), and variable-absorption techniques such as differential piece dyeing. Probably at a later date, the printing of wool textiles may prove possible, and this could have immense impact both on dyeing equipment, and on the structure of the industry in terms of vertical and horizontal integration and commission operation.

The stimulus for these new developments is largely the cost of the dyeing process, whose significance is shown by the fact that dyeing accounts for about 35 per cent of conversion costs for all worsted yarns other than fine counts, where it falls to some 20 per cent. Similarly, for bulk trade worsted cloth, and for woollen yarns, dyeing accounts for up to 20 per cent of conversion costs. Only in fine worsted and woollen cloths does dyeing account for less than 10 per cent of total conversion cost. Much of the emphasis for continued improvement in overall dyeing techniques may thus come from the bulk woollen and worsted sectors, as these are the areas in which improvements in dyeing costs will be most significant.

## 13.2 Loose-stock dyeing

As shown in Table 13.1, at the end of the chapter, the overall throughput of the loose-stock dyeing plant in the industry should fall by some 8 per cent to around 105 million lb per year in the next seven years, one notable feature being the considerably greater proportion of man-made fibre, at some 40 per cent of the total. It should also be noted that quantities given in Table 13.1 refer only to the flow of materials within the wool textile industry. In practice, some dyers, although based in the industry, also dye loose stock for the cotton industry, yarns, pieces and garments for the knitting industry, and loose stock and yarns for carpet manufacturers.

The main elements of conversion costs (see Definitions and Assumptions) of loose-stock dyeing are shown on Figure 13.1(a). This shows costs for representative large-vessel normal and high-temperature units, the costs not varying much with fibre type. The lower costs of the high-temperature process are almost entirely due to the lower labour requirements which result in turn from the increased speed of processing. Typically, four dye lots can be handled in a single 8-hour shift compared with only two lots with normal-temperature equipment. The high-temperature plant also gives added flexibility, as previously discussed, though this is not evident from a simple conversion cost comparison. Nevertheless, there is little economic justification for replacing normal-temperature units by new high-temperature plant, unless multi-shift operation is used.



(a) Cost comparisons

(b) Effect of lot size

FIGURE 13.1 – COMPARATIVE COSTS OF LOOSE-STOCK DYEING

Figure 13.1(b) illustrates the significance of dyeing lot size (which will always be less than 50 per cent of the order batch size, unless the batch is extremely small), on conversion costs; the advantage of using the largest possible individual lots is evident. Large lots will tend to occur in the carpet yarn trade, where batches of well over 1,000 lb are common. Orders for weaving yarn stock dyeing can be as low as 100 lb, for which the dyeing conversion cost would be considerably greater, and for which a suitable premium must be charged. As shown on Figure 13.1(b) there is little advantage in installing a large number of different sized vessels, as the larger units can operate reasonably economically down to some 40 per cent of their full capacity, whilst the smallest units (with capacities of some 150 lb) sometimes handle lots as low as 25 lb.

There should thus be some investment in large-vessel, high-temperature equipment, to cope with the increase in the throughput of man-made fibre for the carpet yarn trade, which will need to be operated on as many shifts as possible. Much of this new plant will be versatile in that it must be capable of handling tops or yarn on package even though auxiliary processes differ. The requirements for much of the current normal-temperature plant will decline somewhat, and this type of plant should continue to be operated at around the present average level of 50 hours per week. By the mid-1970's, it is envisaged that normal-temperature loose-stock dyeing should account for about 60 million lb per year output, and high-temperature plant for 45 million lb, manpower requirements falling by some 30 per cent. Whilst three-shift working on new high-temperature plant is to be recommended, the fluctuations in workload and the high proportion of commission dyeing suggest that the average actually worked in practice will be two-shift rather than three.

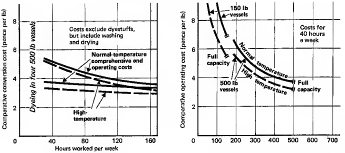
## 13.3 Top dyeing

One of the most significant changes in the overall pattern of dyeing within the industry over the next seven years should be a swing from top to package yarn dyeing on the worsted system, as shown in Table 13.1. During this period, the dyeing of tops in hank form should virtually cease, the remaining colouration being of tops in ball form.

The main difference in conversion cost between the balled top and package yarn method of dyeing are at present due to the need for recombing and regilling of the top-dyed fibres, which can account for up to 40 per cent of the total colouration cost. The use of carded sliver dyeing (at present being developed) in which the fibre is dyed in sliver form prior to first combing also eliminates the need for recombing.

The main advantages claimed for dyeing at the top stage are quality and variety of output, in that there are a number of colour effects and possibilities of accurate colour-matching which can only be obtained by the controlled mixing together of a selected range of coloured tops. On the other hand, if the fibre colouration is left until the yarn stage, full advantage can be taken of spinning very much larger batch sizes. Stock levels can be greatly reduced, and, most important of all, the speed and flexibility of service in terms of coloured yarn delivery to the manufacturer can be vastly improved. Although various claims are made to the contrary, in the long-term a premium should be obtainable for this better customer service, and in our opinion the potential advantages of greater measure package yarn dyeing more than outweigh the shortcomings.

As with the other dyeing processes, costs can be reduced with the introduction of high-temperature equipment and multi-shift working, as shown in Figure 13.2. However, in the light of the current excess capacity (45 per cent as shown in Table 1.8) and the recommended fall in the quantity of tops dyed over the next seven years of some 40 per cent, the level of investment in new high-temperature equipment for top dyeing alone will be relatively low. As in the case of loose-stock dyeing, any new high-temperature equipment should be able to handle tops, loose stock or yarn on package, to enable the highest level of plant utilisation to be obtained. Total labour requirements of top dyeing should fall by some 50 per cent, with a tendency to higher levels of shift working.



(a) Cost comparisons (b) Effect of lot size

FIGURE 13.2 – COMPARATIVE COSTS OF TOP DYEING

The present recombing and regilling plant capacity is more than adequate to meet the needs of the industry in the mid-1970's, and as a result, there will be no need for new equipment in this area. The present average of some 80 hours worked per week is not likely to change. The majority of the plant will be Noble combs, although redundant plant will be selected on its degree of obsolescence in a given establishment, rather than on its type. Some 30 per cent fewer re-combs will be required by the mid-1970's compared with present-day.

## 13.4 Yarn dyeing

Yarn is dyed either on hank or in package form, and a significant quantity of fibre is processed in both forms on both woollen and worsted systems as Table 13.1 shows.

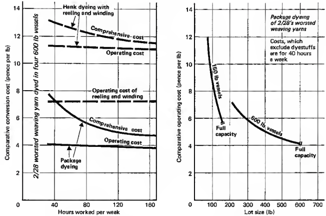
### *Hank yarn dyeing*

Although there is not likely to be any dramatic increase in the next seven years in the quantity of material dyed on hank on either system, the total weight of hank-dyed fibre is likely to exceed marginally the quantity dyed by any other single colouration process in the mid-1970's; however, it is likely that the throughput of yarn dyed on package may well overtake the total of the hank-dyed material in the longer term. The cost comparisons shown in Figure 13.3 for high-temperature hank and package yarn dyeing relate to a typical medium-count worsted weaving or hosiery yarn, and for this type of yarn, dyeing on package is significantly cheaper. Hank yarn dyeing is, however, marginally cheaper for the bulkier yarns, such as woollen carpet yarns or worsted hand knitting yarns, and by the mid-1970's the major part of the yarn dyed in hank form will be for these end uses. In the case of hand knitting yarns, the cost of the additional hank-to-cone winding operation, necessary for weaving and hosiery yarns, is eliminated, and this improves the relative competitiveness of the hank yarn dyeing process in this particular trade.

At the present level of shift working, hank yarn dyeing capacity is only 10 per cent in excess of requirements. Almost all the existing plant is normal temperature, of which some 25 per cent is over twenty years old; this should gradually be replaced by new high-temperature equipment operating at least 60 hours per week.

### *Package yarn dyeing*

On the grounds of conversion costs alone, the case for a significant swing from top dyeing to package yarn dyeing on the worsted system is not particularly strong. However, the lower



(a) Cost comparisons (b) Effect of lot size

FIGURE 13.3 – COMPARATIVE COSTS OF YARN DYEING

production costs due to the increase in white spinning in large batches to stock (as opposed to coloured spinning in small batches to order) together with the greatly-improved customer service in terms of delivery time and availability (admittedly only of solid and twist yarns) are such as to warrant the doubling of the package yarn dyeing activity in the industry by the mid-1970's. Conversion cost comparisons between high-temperature package and hank yarn dyeing are given in Figure 13.3 and comparison with ball top dyeing costs on Figure 13.2 shows the conversion cost advantages mentioned above.

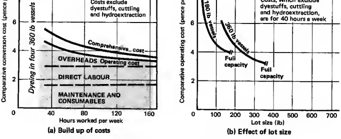
The fact that, especially on the Continent, there has already been a significant swing to dyeing at the yarn stage, especially for worsteds, means that many overseas customers for yarn have become accustomed to the high level of delivery service which can result from this practice, and this, in the export market at least, places the coloured worsted spinner at a disadvantage. In this country, the long sequence of processes and changes of ownership which must be gone through between receipt of order by the manufacturer to delivery of the required cloth give rise to long delivery periods, inability to respond rapidly to fashion swings even to the extent on occasions of having to refuse repeat orders, and some features of marketing, such as the 'on-call' system. A certain proportion of package dyeing of white yarns could do much to relieve this congestion and improve the overall competitiveness of the industry, without in any way affecting the reputation for quality cloths. Variation in design could still be achieved by twisting package dyed singles yarns, in addition to the proportion of top dyed material. It is therefore recommended that high-temperature package dyeing plant be installed sufficient to provide a total of some 50 million lb per year of yarns by the mid-1970's; this implies that 35 per cent of worsted yarns should be package dyed by that time, a low figure compared with current Continental practice.

### 13.5 Piece dyeing

The dyeing of piece goods is perhaps the most critical of all the processes of colouration used by the industry, in that there is no margin for error, and no possibility of blending or modifying the dyed product once processed. This is also true of package yarn dyeing, of course. In general, piece dyeing is thus restricted to the non-specialist fabrics on both the woollen and worsted systems The slight fall predicted for piece dyeing as an activity by the mid-1970's results from the predicted changes in throughput of woven cloths, but is subject to fashion changes and this prediction may therefore be unreliable.

Cloths containing only animal and cellulosic fibre can be dyed satisfactorily in open-winch machines, but those containing synthetics need to be processed on high-temperature dyeing plant. At present, only 5 per cent of current capacity is high-temperature, and all this plant is of the beam type. However, developments are in hand to make high-temperature winch-dyeing a practical proposition, and although it is unlikely that the conversion costs will be significantly different from the equivalent beam dyeing units, the physical flattening of raised-surface cloths which often occurs with beam dyeing should be largely eliminated. The possibility of using continuous piece dyeing plant, as is in current use in the USA, is being considered by some large operators, although the full economies of the process (whose costs, it is claimed, may be less than half the operating cost of high-temperature or winch dyeing) are not apparently achieved at lot sizes of less than around 500 pieces. This represents some four or five hours continuous output. As a result, it is unlikely that fully-continuous processing will find a significant application in the wool textile industry, although the development of semi-continuous piece dyeing techniques may well prove appropriate in the long run. Piece dyeing techniques which make use of the different absorption characteristics of various fibres, natural or synthetic, are likely to find a limited application in the industry over the next seven years, their advantages lying mainly in the potential savings in stock levels of a variety of cloths rather than in the reduction of the dyeing process costs.

Representative conversion costs for normal-temperature winch piece dyeing are given on Figure 13.4 from which it is clear that the influence of lot size is much more significant than that of multi-shift working, even with new plant. Although the curves have been drawn as continuous, the lot size in practice would be divided into increments due to the fact that the vessel loads would normally be made up of a number of pieces of cloth. The picture is similar for the high-temperature beam or winch equipment, though with slightly lower operating costs and a rather higher capital cost for new equipment.



(a) Build up of costs (b) Effect of lot size

FIGURE 13.4 – COMPARATIVE COSTS OF PIECE DYEING

### 13.6 The future of alternative dyeing procedures

As already described, the main changes in the overall pattern of dyeing should be greater use of high-temperature plant, a deliberate investment in package yarn dyeing, and a move towards yarn dyeing away from loose-stock and top dyeing.

The pattern of plant replacement and new investment required by the mid-1970's is illustrated in Table 13.2 which shows the level of capacity of new plant which will be required for each dyeing activity, together with redundant capacity (or that available for dyeing non-wool textile materials) each based on the recommended level of shift working for the future. There will be no need for new investment in normal-temperature plant for dyeing at any stage, and investment in new high-temperature plant will be greatest in package yarn dyeing, in which some 57 million lb per year capacity (at 100 hours per week) should be installed over the next seven years. Investment will also be required for new loose-stock dyeing plant (to provide 53 million lb per year capacity at 80 hours per week) and new hank yarn dyeing equipment (for 24 million lb per year capacity at 60 hours per week).

In terms of the establishment size required to achieve reasonably full economies of operation, the output below which a completely new processing unit should not in general be considered can be derived from the method of dyeing, hours worked per week, and the average dye lot size. This latter will be at most some 50 per cent of the order size, to minimise the risk of miscolouring. Table 13.3 shows the minimum economic sizes in terms of annual output for various types of dyeing unit, assuming operations at 75 per cent utilisation on the hours per week already recommended in the preceding articles. This is an overall increase of some 5 per cent in the average present level of plant utilisation across the industry, which should automatically result from the greater flexibility of plant usage for more than one product, i.e. loose-stock, tops or yarn on package. These establishment sizes are based on the use of high-temperature plant throughput, with a typical cycle time of 2 hours per dye lot.

Table 13.1 – Changes in the pattern of dyeing

| | *Output (m lb per year)* | | | | *Total change by the mid-1970's* |
|---|---|---|---|---|---|
| | *Worsted* | | *Woollen* | | |
| *Material* | *Present* | *Mid-1970's* | *Present* | *Mid-1970's* | *(per cent)* |
| Loose stock | 0 | 0 | 114 | 105 | −8 |
| Top | 113 | 70 | 0 | 0 | −38 |
| Yarn in hank | 43 | 47 | 51 | 58 | + 14 |
| Yarn in package | 35 | 78 | 7 | 6 | +100 |
| Piece goods | 17 | 17 | 43 | 39 | −7 |

Table 13.2 – Dyeing plant in the mid-1970's

| *Dyeing process* | *Output in mid-1970's (m lb per year)* | *Average hours per week* | *Capacity (m lb per year)* | | | |
|---|---|---|---|---|---|---|
| | | | *TOTAL required* | *Existing* | *To be purchased* | *To be scrapped* |
| *Loose stock:* | | | | | | |
| Normal temperature | 60 | 50 | 80 | 153 | – | 73 |
| High temperature | 45 | 80 | 60 | 7 | 53 | – |
| *Top:* | | | | | | |
| Normal temperature | 40 | 50 | 53 | 130 | – | 77 |
| High temperature | 30 | 60 | 40 | 34 | 14 | – |
| *Package yarn:* | | | | | | |
| Normal temperature | 34 | 60 | 44 | 36 | – | 8 |
| High temperature | 50 | 100 | 67 | 10 | 57 | – |
| *Hank yarn:* | | | | | | |
| Normal temperature | 78 | 50 | 104 | 103 | – | 1 |
| High temperature | 27 | 60 | 36 | – | 24 | – |
| *Piece:* | | | | | | |
| Normal temperature | 45 | 70 | 60 | 80 | – | 20 |
| High temperature | 11 | 80 | 15 | 3 | 12 | – |

Table 13.3 – Levels of operation of dyeing establishments

| *Material* | *Average lot size (lb)* | *Average operating hours per week* | *Minimum output for reasonable economies of scale (m lb per year)* |
|---|---|---|---|
| *Loose stock:* | | | |
| Medium woollen | 200 | 60 | 0·9 |
| Carpet | 1,000 | 70 | 5·0 |
| *Top:* | | | |
| Fine worsted | 100 | 50 | 0·4 |
| Bulk worsted | 300 | 60 | 1·3 |
| *Hank yarn:* | | | |
| Hand knitting | 400 | 50 | 1·5 |
| Carpet | 1,000 | 60 | 4·5 |
| *Package yarn:* | | | |
| Bulk worsted | 300 | 80 | 1·8 |
| Hosiery | 400 | 80 | 2·4 |
| *Piece:* | | | |
| Light woollen | 120 | 60 | 0·5 |
| Blankets | 1,000 | 80 | 6·0 |

# Chapter 14 Inter-process activities

## 14.1 Stockholding

Article 1.11 quoted the present level of stocks in the industry as about £190 million, shown to be nearly 45 per cent of the total assets of the industry. The equivalent interest on the finance thus locked up represents about half of the industry's present annual gross profits, so that any reduction in stock levels must have major effect on profitability. However, with the number of establishments, variety of final products, and range of possible raw materials and production systems, it is not possible to perform a rigorous study arriving at optimum stock levels for the whole industry. This article, therefore, discusses the various factors affecting stock levels, including the recommendations of Chapters 9 to 13, and arrives at a reasoned opinion of changes which should be made by the mid-1970's.

Stocks of raw wool represent some six months consumption, stocks of tops represent about two months consumption, and those of yarns and cloths also represent some two months supply. Whilst at first sight these figures may seem high, it should be borne in mind that, for raw wool, paid for 14 days after purchase, clearance through docks may take a month, that at least some qualities of tops should be relaxed for four to six weeks, and that many spinners and manufacturers will need to have a month's throughput in the form of work in progress on machinery.

The four basic reasons for stockholding are:

(a) defence against (or speculation in) wool price fluctuations;

(b) work in progress;

(c) buffer production stocks;

(d) service to customers.

Each factor is discussed in turn below.

### *Defence against raw material price fluctuations*

There are three significant influences currently at work, all of which should lead to more stable wool prices than used to obtain. The first, which is within the confines of the industry, is the existence of the futures market, albeit with a limited number of types of top contract. The second is the efforts of the woolgrowers in Australia and New Zealand to supply wool more efficiently and with greater price stability in order to keep their share of the market. The third, and probably the most significant, is the rapidly increasing consumption of man-made fibres. These are sold effectively at constant prices over considerable periods of time, as shown in Article 3.10; furthermore, their strategic price movements appear to follow a classic decreasing pattern, implying that, as future production increases, there will be still further price reductions. The increasing substitutability of such fibres for wool will tend to produce an increasingly close relationship between the two price structures.

For these reasons, therefore, it is anticipated that stock levels of raw wool will tend to fall. There will be less scope for speculation; in addition, a fall in stock level should occur on the basis of the 12 per cent decline in wool consumption forecast in Article 9.1, even if the same number of weeks' requirements are held as at present. It is, therefore, suggested that, by the mid-1970's, the industry should be operating with wool stocks some 20 per cent lower than at present.

### *Work in progress*

The reduction in the total work in progress element of the industry's stocks should be relatively small, even taking account of the processing changes recommended in Chapters

9 to 13. In general, the introduction of new methods, such as improved aqueous scouring, high-performance carding, and modern ring spinning, will not reduce the total work in progress, and apart from reductions in weaving time, due to the introduction of pirnless or improved automatic looms, there will be little overall changes by the mid-1970's. The fact that there should tend to be an increase in the average batch size in weaving, so that average warp sizes will rise, will largely negate the savings in the time for which the yarn is held on the loom during manufacture.

It is, therefore, suggested that the total reduction in work in progress should only be some 5 per cent by the mid-1970's.

*Buffer production stocks*

Changes towards faster production methods, and towards larger package sizes, will tend to increase the levels of intermediate process stocks necessary to ensure the continued smooth flow of production. However, there will be a countervailing tendency if average batch sizes rise. For example, in weaving, if it is assumed that some 30 hours' output needs to be held as an upstream buffer stock as warps on beams, the quantity to be held will rise as the output per hour rises with the introduction of faster weaving machines, but will fall as the number of cuts per warp rises with larger batch sizes.

It is thus anticipated that the future changes in buffer production stocks should be small during the next seven years, and will only reduce the total stock level by some 3 per cent throughout the industry.

*Stocks to provide customer service*

At present, apart from the stocks of finished cloth held 'on call' for customers, the level of material held in order to provide customers for tops, yarn or finished cloth with a form of 'off the shelf' service is relatively small, as the vast majority of firms make to order. This is the result of the extremely wide variety of products normally offered by individual companies; with this sort of marketing policy, the level of stock materials required would generally be prohibitively high, and would probably result in a high percentage of unsold stock, or of finished goods awaiting call-in and payment.

In the future, as argued in Article 15.3, there should, however, be a greater degree of making to and selling from stock, which implies that average stock levels for yarns and cloth will rise. On the other hand, the measures advocated in Chapter 15 concerning the 'on-call' system will lead to a reduction in cloth stocks. The other influence is the greater use of package yarn dyeing, which should increase the levels of white yarn stocks, reduce those of coloured yarns and tops, and should also permit the time period between receipt of order and start of manufacture to be reduced.

There are thus roughly equal opposing forces operating on the stock levels of yarns and cloths, and it is, therefore, suggested that future stock levels should not be significantly different from those at present for customer service reasons. Certainly the industry for many years has been well aware of the significance of stockholding costs, and is actively trying to reduce them. It is, therefore, suggested that present stocks for customer service should be capable only of a 1 per cent decrease by 1975. The industry should, however, attempt by liaison with clothing and hosiery companies to improve this decrease; and inter-company liaison within the industry, too, should be encouraged to help reduce unnecessary stock levels or lengths of stockholding.

*Overall stock reductions*

In addition to the stock changes discussed above, it is known that several of the larger groups in the industry are currently attempting to minimise their group inventories from overall consideration of market requirements (quantity, price, delivery), processing system, and batch sizes, using computer systems. Any estimate of resulting stock reductions must at this stage be arbitrary, but assuming that large groups provide some 20 per cent of the industry's output, and that they will be able to achieve a 15 per cent reduction in their stocks, the overall industry stocks should fall by about 3 per cent. Table 14.1 summarises the changes put forward in this Article, which together imply a 12 per cent reduction in the industry's stock level over the next seven years, allowing for increases in stocks due to the adoption of knitting.

**Table 14.1 – The industry's stocks**

| | *Stocks and work in progress (m lb)* | | | | | |
|---|---|---|---|---|---|---|
| | | *Reductions by the mid-1970's* | | | | |
| *Material* | *At present* | *Raw materials* | *Work in progress* | *Buffer stocks* | *Customer service* | *Proposed* |
| Raw wool | 180 | 36 | — | — | — | 144 |
| Tops | 45 | — | 3 | 2 | 1 | 39 |
| Yarns and cloth | 100 | — | 5 | 3 | 1 | 91 |
| TOTAL | 325 | 36 | 8 | 5 | 2 | 274 |

The financial implications of these savings are:

| *Material* | *Savings (£m)* | *Resulting stock (£m)* |
|---|---|---|
| Raw wool | 12 | 48 |
| Tops | 3 | 17 |
| Yarn and cloth | 10 | 100 |
| TOTAL | 25 | 165 |

## 14.2 Materials handling

The subject of the movement of material of all types throughout the industry has been divided into three main categories: materials movement outside mills, materials movement allied to specific production activities, and movement in mills which cannot be linked with specific production activities. The first includes the conveyance of raw materials (where owned by the industry), to the mill, inter-mill transfer to intermediate products, and despatch of finished products to the customer. These topics are discussed in Article 14.4. The second (material movement which is an integral part of a production activity) is carried out by the operators directly associated with the process itself, and costs have been included in the relevant sections of Chapters 9 to 13 as part of the direct process labour required. The third includes movement of incoming material from the point of delivery to the initial processing area, inter-process transport, the removal of waste and the conveyance of finished products from the point of completion of manufacture to the despatch or packing area. These aspects are discussed in this Article.

The methods used for the handling of materials within establishments vary widely, both in terms of the items handled (which can vary from a 1,000 lb bale of South American wool to a weaving pirn of only an ounce or so) and in the level of sophistication of the systems used. The application of up-to-date methods of materials handling in the wool textile industry has tended to lag behind that of a number of other industries, for two main reasons. Firstly, the industry possesses a large number of old buildings which do not lend themselves to the installation of sophisticated handling equipment by virtue of their multi-storey layout and limitations on permissible floor loadings. Secondly, much of the handling is an integral part of the direct process operations, and many of the existing job definitions are in fact combinations of handling and machine-minding.

A measure of the overall significance of material handling costs throughout the production of standard, medium-weight worsted and woollen cloths is shown in Table 14.2, which details the main process areas where handling costs are significant, together with their range of variation.

**Table 14.2 – Handling costs**

| *Activity* | *Handling manpower per cent of all direct labour* | *Typical labour cost (pence per lb)* |
|---|---|---|
| Worsted sorting | 2-10 | ·07 |
| Combing | 3-5 | ·10 |
| Tow-to-top conversion | 1 | ·01 |
| Woollen sorting | 5-15 | ·20 |
| Woollen blending | 10-30 | ·30 |
| Woollen carding | 3-10 | ·20 |
| Drawing and twisting | 2-6 | ·12 |
| Twisting and winding | 2-5 | ·14 |
| Semi-worsted yarn production | 1 | ·02 |
| Warp and weft preparation | 2-5 | ·01 |
| Non-automatic weaving | 3-6 | ·60 |
| Automatic weaving | 2-4 | ·30 |
| Pirnless weaving | 1-3 | ·15 |
| Mending | 2-5 | ·42 |
| Finishing | 1-4 | ·30 |
| Dyeing | 5-15 | ·25 |

Capital costs relate to establishments with a typical output of at least 2 million lb per year in the material preparation stages, and of 1·0 million lb per year for yarn-making and subsequent processes. For a typical worsted cloth, the total handling cost varies from about 1·0d to 2·5d per lb, which represents around 1 to 2½ per cent of the total added value of the product. The total cost of handling for a similar woollen cloth would be some 0·5d per lb higher due to the greater importance of the sorting and blending stages of production, in which a significant portion of the overall handling cost is generated.

In the handling costs associated with sorting for the worsted or woollen systems, a wide variation in cost will occur, depending on the type of wool being processed rather than on the type of handling system. The handling costs could be up to 8 per cent of the direct labour for sorting speciality woollen or Australian merino worsted material, and as low as 2½ per cent for tweed, greasy woollen, or English wool material. The handling of the material during blending and carding on the woollen system can be either pneumatic or mechanical; the former system is the most modern and accounts for the lower handling costs quoted, whilst costs of up to three times these levels can be generated by using the older mechanical handling techniques.

There is little variation between the costs of material handling for the drawing, spinning and twisting operations on the woollen and worsted systems, the requirements in general being for the movement of material in skeps and cartons to and from the individual processes. There is a wide variation of handling costs in fabric manufacture, due to the variety of levels of automation on the loom types, and the fact that pirnless machines use the spinning package direct for weft input. In dyeing processes, there is a relatively low manning requirement for the basic process, as the handling functions have in general been split in terms of job definition from the actual machine control.

The total handling costs are such that it is extremely difficult to justify any large-scale capital expenditure in order to improve the handling facilities alone. It thus appears that materials handling must necessarily be treated as a tactical rather than a strategic problem, as the possibilities for improvement are determined by individual buildings and plant layouts. The removal of the worst bottlenecks in the older mills need not, by and large, involve much capital. It goes without saying that if extensions or new buildings are justified for other reasons, their design should be such as to permit easy handling. This will in general mean single-storey buildings, or multi-storey with adequate lifts, high permissible floor loadings and floor space unobstructed by pillars, pipe runs, and the like. Although some mills are presently embarrassed by their inability to improve handling systems, the costs of present systems over most of the industry do not appear to be excessive, and there is no useful recommendation which can be made at the strategic level.

### 14.3 Package sizes and tare

The sizes of the individual packages in which the material planning through the process chain of the industry is subdivided are important in that they not only influence the handling methods, but also affect the upstream and downstream processes. By controlling the period of operation between replenishment and removal of material from the machine, they determine to a large extent the level of work in progress at any given time.

The materials may be handled in any of four basic states—raw wool, tops, yarns, and finished cloth—which are considered in turn below.

#### *Raw wool*

Greasy wool is normally imported into the United Kingdom (or conveyed within the country, if a part of the home clip) in bales which vary from some 300 to 1,000 lb in weight, depending largely on the country of origin. Over 80 per cent by weight of the raw wool is in single bales of between 300 and 400 lb, being the home and Commonwealth wools which accounted for some 1·2 million bales during 1968. The remaining 20 per cent, largely South American in origin, was in 800 or 1,000 lb bales, of which some 0·12 million were imported.

In order to reduce the number of individual bale units handled, especially at the docks, a number of experiments have been carried out with multiple units of 3, 6 and 9 standard Commonwealth bales, banded together to form a single unit of approximately 1,000, 2,000 or 3,000 lb respectively. There appear to be some overall advantages of the triple-bale arrangement, in that these multiple units would then broadly correspond in weight to the South American bales from Uruguay, and could be easily handled by facilities which were already coping with these single bales. The handling advantages of the larger multiple-bale units would appear, however, to be outweighed by the problems of providing cranes and access space in many mills, and in some cases floor loading restrictions, and therefore the general adoption of the multiple-bale system cannot be recommended at the moment.

For a number of years, investigations have been going on to develop methods of increasing the bulk density of a typical bale from its present 19 lb per cu ft. Trial bales of up to 35 lb per cu ft have been produced, and although some problems were encountered in opening and sorting from the packed fibre, the industry should make significant savings in shipping costs from this development.

Current tare consists of hessian covers, which can be open-ended, with multiple steel bands; some work is in progress to investigate the advantages of slit man-made fibre woven or knitted bale covers, and these may well prove attractive and economic in the long run; however, the present tare only accounts for some 11 lb for standard 350 lb bale, and is quite effective and cheap.

*Tops*

Traditionally, most tops have been produced in standard weights as shown below, which broadly correspond to the concept of all tops producing the same length of yarn, whatever the quality, after spinning:

| *Wool type* | *Top weight (lb)* |
|---|---|
| Merino 64's (and finer wools) | 6·75 |
| 60's | 7·125 |
| 58's | 8 |
| 65's | 8·75 |
| Low quality crossbreds (50's and below) | 11·125 |

These are only broad guides, and at present a large number of customers require their own special sizes of top, for which they have organised their drawing and spinning systems. However, there is an increasing tendency (especially on the Continent, which as a whole is a significant importer of United Kingdom tops) to standardise on the use of 50 lb 'bumped' tops, and this trend is being followed by several worsted spinners in this country. There are a number of advantages in the more general use of standard large-weight tops, inasmuch as they reduce the frequency of packing and handling, and the replenishment of the material supplied to the drawing sets, and it is recommended that the industry should endeavour to go onto this standard. The adoption of vacuum-packing techniques should become much more widespread, especially at the larger top-producing mills, and this in turn will lead to the much greater use of polypropylene- or polythene-lined hessian wrappers. These will also ensure adequate protection against moisture and mildew during transportation.

*Yarn*

The fact that there should be an increase in the total quantity of material dyed as yarn by the mid-1970's will mean that there will be movement of greater weights of yarn than at present, so that the use of the most efficient forms of packaging becomes of particular importance.

Yarn can be handled in one of four basic forms:

(a) in hank, either for hank yarn dyeing, or to the customer in the case of hand knitting yarns;

(b) on cone or cheese, either for package yarn dyeing, or to the weaving or knitting sectors;

(c) on beam, for use as the warp input for weaving;

(d) direct-spun pirn.

The quantity of material handled in the first form should remain broadly constant, since only marginal changes are forecast in outputs of hand knitting yarn and hank yarn dyed material. Current hank bales are typically 250 lb in weight with a density of 10 to 12 lb per cu ft. Vacuum-packing should be more widely used in the future, to increase the bulk density to some 18 lb per cu ft, and to produce a more manageable bale. This again will necessitate a greater use of polythene or polypropylene covers in the future, in place of the currently-used hessian packs, and the practice of packing in raw wool tare, giving 500 to 600 lb bales, should largely die out in the future.

There will be a significant increase in the movement of yarn on cone or cheese, due to the doubling of the quantity of package yarn dyed material, and this should be accompanied by a steady increase in the average size of the yarn packages. The use of cones as opposed to cheeses should be encouraged as a means of improving stock service and permitting more economic winding and warping. Standard 9° cones and 4° should be adopted for delivery to knitters and to weavers respectively. As the existing skeps or wicker baskets wear out, they should be replaced by stackable units which can, where possible, be handled by mechanised fork lift trucks.

Although the transport of yarn on beam will undoubtedly continue to a limited degree, the most logical location for warping and beaming has been shown to be the weaving establishment (in Article 12.2). The movement of beams should, therefore, tend to decline.

*Finished cloth*

In the next seven years there are likely to be relatively few significant changes in the overall package sizes and tare for finished cloth. There may be a tendency for some of the larger operators to supply double-width cloth, though in the folded form this will only increase the diameter and weight of a bolt of cloth, neither of which will materially influence the tare requirements.

The most important changes, which will only affect certain parts of the industry, will result from the modified methods of despatch chosen for particular markets; the greater use of air freight, and the introduction of a greater degree of containerisation are typical developments which will modify the tare requirements. Some cloth finishers are at present virtually eliminating the use of tare on finished cloth pieces by employing scrupulously clean delivery vans on an experimental basis. Advantages claimed for this system include reduced time of handling, minimised delay due to packing and unpacking, and the instant recognition of incorrect deliveries by the customer due to the absence of packing. It is believed that this should have a limited application by the mid-1970's for national distribution of finished goods.

## 14.4 Transport

There are several developments now in hand which should influence the pattern of materials transport over the next seven years. The most important of these is the increasing use of containers, especially for the Australia-England voyage, and also in roll-on roll-off or liner-train facilities for services to the Continent. It is important that the industry takes every advantage of these new developments, the costs of which must fall over a period of time. The increasing availability of air freight services must also not be neglected; there may well be cases where a market can best be served by means of air transport, the reductions in transit times, and thus in stock held during transit, more than balancing the higher freight charges.

Table 14.3 shows the current pattern of transportation systems used for the various materials, the information being derived from questionnaire returns. The table does not include sea transport from country of origin.

*Raw wool*

The larger operators, being those handling more than 1 million lb per year, tend to use coastal shipping from London, or at least make use of such provisions as the Bradford Bill of Lading or the Yorkshire Forwarding Allowance for certain classes of Commonwealth wool. It is significant that, at present, virtually no raw wool goes by rail. Theoretically, rail systems should be able to offer competitive rates for distances in excess of 100 miles using specific-destination liner trains with containers. However, without co-operative buying and shipping, such developments would appear unlikely during the next seven years unless large 'containerised' shipments of wool to London become common.

The use of containers will undoubtedly become more widespread with the commencement of the regular Australia-England container-ship route, even though this could terminate at Rotterdam instead of Tilbury if present labour negotiations fail. Up to 60,000 lb of raw

Table 14.3 – Present use of transport facilities

| | *Material handled (per cent of total weight)* | | | | | |
|---|---|---|---|---|---|---|
| | *Road vehicles* | | | | | |
| *Material* | *Owned by industry* | *Under contract* | *Rail* | *Sea* | *Air* | *Post* |
| Raw wool (large merchants) | 56 | 44 | | | | |
| Raw wool (small merchants) | 25 | 75 | | | | |
| Rags and waste | 30 | 30 | | 40 | | |
| Scoured wool | 50 | 40 | | 10 | | |
| Tops | 60 | 20 | 5 | 15 | | |
| Woollen yarn | 30 | 40 | 15 | 15 | | |
| Worsted yarn | 60 | 25 | 5 | 10 | | |
| Woollen cloth | 15 | 43 | 15 | 20 | 2 | 5 |
| Worsted cloth | 15 | 60 | | 25 | | |

wool can, in theory, be packed into one standard 20 ft ISO container using dumping densities of up to 30 lb per cu ft as is anticipated in the next few years. The whole pattern of the development of the large integrated wool-handling 'villages' in Australia, followed by the containerisation of the wool for the sea passage, could bring about either a fall in the delivered price per bale, or at least a stabilisation of the price in the face of other rising costs. The industry should make full use of the potential advantages of the system, including encouraging the development of liner-trains from London to Bradford should the opportunity occur.

*Tops*

The fall of some 15 per cent in the total United Kingdom output of tops, together with the envisaged reduction in top dyeing, will mean that there will be some reduction in the transportation requirements for tops by the mid-1970's. The fact that the level of exports should remain relatively constant will mean that the same quantity will be handled by sea freight. It is probable that the overall balance between road and rail will remain unchanged, as the majority of the routes will be less than 100 miles, below which well-run road transport is normally the cheapest.

*Yarn*

There will be an increase in the movement of yarns by the mid-1970's, due to the increase in package yarn dyeing, even though warping and beaming should tend to be carried out more by the manufacturers, thus largely reducing the need for beam movement outside production establishments. The yarns should be on more standardised cone packages than at present, in stackable and possibly palletised containers which can easily be loaded and unloaded with the aid of fork lift trucks. A large part of the transportation of this yarn will continue to go by road, due to the relatively small distances covered, and the small average size of the batches to be conveyed in terms of lorry capacity.

*Cloth (finished or grey)*

The weight of fabric to be transported in future will rise due to the additional knitted fabric which it is recommended should be produced by the industry, and the pattern of transportation usage will depend largely on the particular markets or destinations concerned. With the increased efficiency and scope of the services to Europe in particular, greater use of containers may well be practicable, especially if manufacturers or finishers are prepared to get together for servicing a common customer or market (as suggested in Article 15.5), and so make better use of the transport services for larger batches. The use of air freight should be seriously considered by all cloth exporters, taking into account the total cost of their overseas marketing effort using the various transportation systems which are available, and it is anticipated that air services may well account for up to 10 per cent of the total fabric handled by the mid-1970's. The balance of the cloth conveyed by road should remain broadly as at present, as the diversity of pick-up points and destinations is likely to be so great as to make the setting-up of a wider range of industry-owned fleets of vehicles impracticable. There should, however, be further interest in the use of clean vehicles, with the virtual elimination of cloth packing, as mentioned in Article 14.3. This will probably be restricted to the larger operators and probably will only be applicable to reasonably direct manufacturer or finisher links to the customer, such as Bradford to London, or within the Yorkshire wool textile area.

### 14.5 Mill buildings

Whilst Chapter 1 dealt with the age structure of existing plant, it did not do so for mill buildings. These were built mainly during the second half of the last century, and although the majority are of sound, substantial construction, the question arises as to their suitability for modern plant and operating requirements. They tend to be multi-storey, with narrow bays and, in some cases, of limited floor loadings, whereas modern factory buildings ideally are single-storey, with very large areas of free space, which permits great freedom of layout and opportunity for mechanical handling systems.

Statements have been made in Chapters 9 to 13 to the effect that on economic grounds there is no justification for industry-wide rebuilding. The following example is typical of the many analyses performed during the study; it relates to the case of a four-storey mill of total floor area 100,000 square feet, employing 500 of which 50 are supervisory, maintenance and administrative personnel. The capital cost differences, and savings in operating cost, are estimated below:

| | |
|---|---|
| Capital for new buildings and land (100,000 square feet at £4) | £400,000 |
| Less: Sale value of existing property (based on current valuations) | 30,000 |
| TOTAL EXTRA CAPITAL NEEDED | £370,000 |
| Annual savings in handling costs: 2½ per cent of total labour bill (see Table 14.2) | £ 12,500 |
| Annual savings in supervision overheads: reduction of 10 men | £ 15,000 |
| TOTAL SAVINGS resulting from new buildings | £ 27,500 |

Thus the annual saving is some 8 per cent of the additional capital required for new building. This is not sufficient to cover depreciation, interest on borrowed funds, and satisfactory profit level.

Nevertheless, there are of course additional advantages less easy to quantify, such as greater ease of recruitment and smaller turnover, of both labour and management, and also the vastly different image projected to employees, customers, and the general public. Some mills may be extremely badly sited with respect to labour supply, or may have excessively high overheads, or may be prevented altogether from installing the best machinery. Thus, whilst there is no general case for rebuilding, it is recommended that each organisation should perform its own analyses to check whether or not it is an exception to the general rule.

# Part Four Future of marketing and organisation

# Chapter 15 Marketing and buying policies

## 15.1 Aspects of marketing

Marketing is the management function which organises and directs all business activities involved in assessing and converting customer purchasing power into effective demand for a specific product, and in moving the product to the final user so as to achieve the objectives set by the company. Successful marketing depends on the acceptance of the principle that a company can only achieve lasting success through the satisfaction of the needs and desires of its customers. Because of this principle, the marketing approach is essentially outward-looking, and is concerned with assessing the needs of customers, and how these can best be satisfied by the products and service of the company.

Another essential management function is production, which is concerned with the efficient use of the company's plant and manpower resources to make its products at minimum cost. By its nature, the production approach is essentially inward-looking towards the company itself. Certain aspects of company policy, such as choice of product range, have a profound effect on both marketing and production, and it is in such areas that conflicts may arise between the two functions. The resolution of such conflicts is the responsibility of general management, and successful management is that which gives the appropriate emphasis to both viewpoints in making policy decisions.

Throughout the wool textile industry there is generally too much emphasis on the production approach and too little on the marketing approach. At the most general level, this means simply that not enough attention is paid to those needs and desires of customers for which they are prepared to pay. Specific examples of marketing opportunities which have not been taken up are discussed in the subsequent articles of this chapter, but a number of general points can be made which indicate the lack of emphasis on marketing:

(a) The industry is generally preoccupied with traditional products, and tends to resist product innovation. Apart from the adoption of man-made fibres as a raw material, the products of the industry have hardly changed in the last 100 years, despite drastic changes in consumer demand. The lack of interest in knitted fabric is an example of this attitude, as is the more recent increase in demand for polyester/modified rayon trouserings, largely taken up by the Lancashire industry. Such trouserings, now based on short-staple, could have been adopted by the wool textile industry on a long-staple basis, and economic comparisons indicated that there would be little to choose between the two methods of production.

(b) Weak selling is prevalent in most sectors of the industry. This topic is dealt with more fully in Article 15.2, where it is shown that weak selling is partly due to over-competition. Even in this situation, however, a strong selling position can be achieved by astute marketing, as is demonstrated by the more successful companies of the industry.

(c) Few companies in the industry would claim to have prepared a comprehensive marketing strategy for their business. Many, indeed, would be unable even to state limited marketing objectives.

(d) In all but the smallest companies, marketing is sufficiently important to be the full-time responsibility of a director. In fact, very few companies in the industry do have a marketing director, and most marketing matters receive only a small proportion of the managing director's time.

(e) A classic symptom of over-emphasis on the production approach is a preoccupation with quality. The British wool textile industry has an unmatched reputation for high quality throughout the whole spectrum of its products, and in many cases this is undoubtedly a selling attribute. Pride in the quality of one's product must not, however, override the objective of maximum profitability; and it is suggested that a very large number of companies in the industry place far more emphasis on quality than is either demanded or required by the market.

The general conclusion to be drawn is that most companies in the industry should place much more emphasis on satisfying only those needs and desires of their customers for which the customers will pay. To this end they should examine the basic characteristics of their customers and their products, and use the results of this examination to define marketing objectives. They should ensure that due regard is paid to these objectives in deciding general company policy, and finally they should devise a marketing plan designed to achieve the stated objectives, including statements of policy in the following areas:

(a) Size of company
(b) Degree and type of promotion activity
(c) Distribution channels used
(d) Pricing policy
(e) Market sectors supplied
(f) Product range
(g) Degree of standardisation
(h) Average production run length
(i) Stockholding service offered
(j) Delivery time offered
(k) Credit and other services to be offered.

The remainder of this chapter is largely concerned with describing options which could be adopted by individual companies within the industry. In most cases it is not feasible for all companies within a sector to adopt the same option. In fact, such is the diverse nature of the industry's markets that the adoption of a particular option by one group of companies will often create an opportunity for a second group to offer an alternative service.

### 15.2 Elimination of weak selling

The characteristic of the British wool textile industry most frequently mentioned and bemoaned by the industry itself is weak selling. The results of weak selling have been described fairly extensively in Part 1 of this report and are generally well-understood. What is sometimes not understood within the industry is that weak selling is not a disease but is a symptom of a disease, and the comprehensive nature of this report is caused by the need to cure the disease itself rather than to suppress the symptom.

Weak selling is the almost inevitable consequence of over-capacity combined with fragmentation, since it is the combination of these two factors which leads to overcompetition. Many of the options discussed in this report refer to one particular aspect of weak selling and propose a remedy; it is suggested here that the only effective remedies for weak selling in general are:

(a) reduction of capacity, and
(b) reduction of number of competing units.

It is necessary here to be quite clear about what is meant by competition. The firms competing for a particular market are all those firms which are willing to supply the product required and to accept the market price. If the total capacity of such firms available to supply the product exceeds demand, then over-capacity exists. This rather formal definition is necessary to emphasise that anybody with a loom is competing in the market for woven fabrics; but it is essential to realise that that market is itself only a part of a larger market for fabrics in general.

There are opportunities for individual companies to reduce both capacity and fragmentation of competition by acquisition and closure. These are undoubtedly valid and effective steps, and will be examined in Chapters 17 and 18. However, they are clearly expensive, available only to a few companies, and on their own unlikely to be wholly successful. Chapters 9 to 13 showed that investment in, and efficient operation of, new plant can eliminate large areas of apparent excess capacity by rendering it obsolete and uncompetitive overnight. This, again, is not available to the whole industry, nor does obsolescence immediately convince the obstinate businessman that he cannot stay in business by price-cutting. This chapter, therefore, is concerned with measures solely in the field of marketing by which individual companies can immediately escape over-competitive situations and adopt strong selling attitudes, by themselves selecting particular well-defined areas of operation in which they will possess key advantages. By taking these steps they will remove both themselves and their chosen markets from the dwindling field of the general practitioner, and since they remove more market than capacity, the over-capacity situation will become even worse for those who remain. For those remaining companies who insist on general practice there is little hope. There is no future in this industry for the firm that will make anything for anybody, at any price.

### 15.3 Specialisation in production and sales

It may appear that there is some incompatibility between the concept of diversification raised in earlier chapters and discussed in Article 15.10, and the idea that companies should become more specialised in their production. No such incompatibility exists in practice, however, since ideally the industry as a whole should become more diverse in its range of products while individual companies within the industry become more specialised. Further, it should be stressed that the concept of specialisation in no way inhibits a company from taking a flexible longer-term approach to its choice of products so that the product range may be altered in accordance with shifts in markets.

The processes involved in the production of wool textiles are in general well established and basically fairly simple, and also extremely flexible and versatile; the result of this is a large number of companies with similar equipment which can and do offer a very wide range of products. This results in a situation where very large numbers of firms are competing directly with each other. A quite different competitive situation would exist if firms adopted a more specialist approach. A company which sells to the part of the total market which it is able to serve best and then optimises the service given to this specific part, will find that competition is less severe and its selling position is strengthened.

The most obvious method of specialisation is to confine production to a limited number of products. Since most manufacturers of woven cloth need to provide a wide range of designs, the option of product specialisation is most obviously suited to producers of intermediate products. It is recommended that certain spinners and combers should choose to produce a single or very limited number of products, aiming to achieve market dominance in these lines rather than satisfaction of all the varying requirements of a number of customers. A by no means insignificant move towards specialisation can also be made by some manufacturers, however, by limiting the range of yarns they incorporate into their cloths. The limitations most easily imposed would be those of count and twist, but it is possible that good design and selective and energetic selling could also succeed with a more restricted range of colour shades of yarns than is commonly adopted.

There is no doubt that the present system involves excessive duplication of effort, and that an industry consisting of a small number of large companies would operate with much more specialisation in individual establishments than occurs at present; thus the adoption of this recommendation will yield benefits normally associated with integration.

It is fundamental to this recommendation that products are made to stock and that a stock service is provided. In addition to the general advantages of specialisation mentioned above, therefore, the adoption of this recommendation can be expected to give the following results:

(a) a greater annual output;

(b) a corresponding reduction in unit costs;

(c) an increase in the cost of stocks and work in progress;

(d) because of the immediate delivery service available to customers, a higher average price should be achieved;

(e) management functions will be simplified and management will be able to devote much more energy towards improving marketing, management control, production efficiency, machine settings, and so forth;

(f) quality and reliability will be increased, thus further improving the price premium;

(g) better opportunities for product promotion will exist;

(h) a reduction in the level of competition from other companies, which will result in increased prices.

It should be appreciated by a company choosing to follow this recommendation that it implies a radical change in the customers served by the company; these will almost certainly be greater in number and more diverse in nature. This is likely to have important effects on the type of selling effort required.

Specialisation may also be undertaken in a number of other ways; for example, some companies can specialise in rapid service, in contrast to others who offer slower service but at lower prices. If a company is capable of producing the required product at the right time, the importance of price is reduced. Price is only of prime importance if the customer is booking forward and anticipating possible market requirements. In this situation it is the customer who is accepting the risks involved and he will only do this if the maximum price concession is obtained; thus to obtain maximum profitability, the manufacturer himself must accept the risks involved in maintaining a short order book and accepting high stock levels. It is recommended that certain companies should develop the forecasting, stockholding and other skills required for operating in this way in order to achieve the higher prices available.

The last method of specialisation suggested is mainly open to producers of intermediate products. An alternative method of obtaining the benefits of long-run production is to be prepared to supply a large variety of products, provided that each item is produced in a reasonably economic batch size. This suggests that only those orders achieving this minimum size should be accepted by some establishments, while small orders become the speciality of others. Many companies could considerably increase their average batch size by reappraising the price differentials they quote between different order sizes. The general practice in the industry is to quote a nominal price which is, in fact, the minimum-quantity price and then to give discounts for quantity. These discounts, however, are rarely sufficient to outweigh the customer's initial preference for small orders. The fact that most companies would welcome larger orders on present pricing implies that the discounts allowed do not fully reflect the additional costs involved in small batch production. It is recommended that most companies should adopt a pricing policy more in line with costs incurred, which would involve a high nominal price with bigger discounts. A company adopting such a policy would be less competitive on small orders, so that more large-order business would be attracted.

It may be seen that the adoption of this recommendation by certain companies would tend to achieve the large-order specialisation discussed above.

### 15.4 Rationalisation of product ranges

In most of the wool textile industry's markets the impact of fashion results in a need for variety. This situation is unlikely to change in the future, and although a small proportion of the market is for standard products such as uniform cloths, it is reasonable to assume that the overall demand will always be for variety.

On the other hand, substantial advantages in production may be enjoyed if unnecessary variety is diminished and production is confined to relatively standardised products. These advantages are associated with the economics of batch size, the simplification of management problems, the possibility of producing to stock, and hence the provision of quick delivery.

The industry is, therefore, faced with two apparently conflicting approaches, one towards variety, and one towards standardisation. It is recommended that standards should be adopted wherever possible in the chain of manufacturing processes, insofar as such standards do not perceptibly interfere with the range of ultimate products as they appear to the public.

In practice this principle implies rationalisation of product range for tops and yarns. In placing an order for these products at present, it is common practice for a customer to dictate the precise specification, with the result that a producer may receive a number of orders for products which are essentially the same, but which must be processed separately because of minor differences in specification. It is recommended that producers in this position should publish a carefully-prepared schedule of standard lines, the number of standards being the minimum necessary to satisfy genuine differences in customer requirements. It should be noted that no specialisation is implied here. The producer's product range may still satisfy nearly all of his former customers. Having produced his schedule of standard lines, the producer may either take the immediate decision not to produce any non-list items, or he may prefer to adjust his pricing policy so that orders for non-list items are only accepted at an appropriate premium. Every attempt should be made to impress on potential customers that a standard line is available which is suitable for their requirements, even though it may not conform precisely to the specification they had in mind.

It must be appreciated that the adoption of standard lines involves a fundamental change in the selling position of a company. Before rationalisation the company is selling the service of providing products, tailor-made to its customer's requirements, whereas after rationalisation the company is selling its products as such. Again the important part of the recommendation is that a stock service should be provided for most lines in the standard range.

It is not suggested that this recommendation is of universal application; inevitably a small proportion of the market will always require non-standard lines and a few producers will continue to provide the existing service to meet this demand. Competition in this sector would be considerably reduced, however, so that the high costs of small-batch production should be recoverable, and indeed these producers should appreciate what their time costs of production are and price accordingly.

It is necessary to consider which product characteristics can be subject to rationalisation in this way. The measurement of wool quality involves a certain degree of subjective assessment; it is clear that there would be some practical difficulties in attempting to establish standards in this field. The introduction of micron count and fibre length as objective measures of quality has led customers to demand particular minute variations even in these parameters, most of which can have no real bearing on the ultimate product. The wool combing sector, with an excellent record of mutual co-operation behind it, is in a perfect position to decide on a precisely-defined standard range of tops, and to undertake to comb no others except at substantial premia. It is, indeed, highly necessary for the sector that it should adopt such an aggressive marketing posture, and immediate concerted action by the majority of the companies in the sector would also be invulnerable to non-cooperation by the minority, who could not expand production to meet the entire market, and would, by apparently restricting the supply of tops to the market, raise the prices obtainable by the sector.

Other examples of standardisation are package specification, oil content and yarn count. Rationalisation of colour range may also yield benefits. Certain standard colours already exist, and it is suggested that many companies could establish more standards to the extent that they could be produced to stock with confidence.

An alternative proposal to individual companies deciding on their own standards is that standards should be established by the industry at large, possibly through the auspices of the British Standards Institution, but with the industry taking the lead. In this case the use of standards would, of course, be voluntary to both producers and buyers, but price premia should be charged for non-standards according to agreed accounting principles. It is recommended that the industry should establish a committee at once to do further work in this field. One advantage of this industry-wide rationalisation is that there would then be a smaller total number of products produced by a sector, so that total stocks held in the industry could be reduced. The advantages to the customer are perhaps more important; the acceptance of industry standards for yarns, for example, would give the weaver the security of supply he needs in order to plan his range. This mechanism already exists, of course, within those sectors of the industry which are vertically-integrated such as the woollen spinner-weavers. Thus the adoption of industry standards would achieve for the worsted sector an important advantage which hitherto has been considered only possible through integration.

Although as stated above the concept of rationalisation cannot be wholly applied to woven cloth, certain options are open to the weaver. Many weavers at present will accept construction and design suggestions from a wide range of potential customers, and subsequently attempt to attract orders for their cloth from the market in general. A common result of this practice is that the range of cloths produced have little in common and cannot be considered a planned range. It is recommended that after taking account of all available market intelligence, manufacturers should plan a range of cloths, preferably based on the minimum number of standard yarns necessary to provide the required variety and design (as discussed in Article 15.3). It is essential that the design initiative should be taken by the manufacturer rather than being left to customers with specific requirements. The natural corollary of this policy is that the demand for a particular yarn is derived from a wide variety of cloths within the range, and is, therefore, much steadier than if that yarn were only required for a single cloth. Thus the requirement is for large quantities of a few yarns for which demand is relatively stable.

Although absolute standards cannot be applied to cloth, certain characteristics of the cloth are subject to standardisation. Before considering options, however, it is necessary to show the disadvantages of the present state of affairs and to indicate the benefits which would result if this could be changed. Certain fabric characteristics which are of great interest to the consumer are at the moment difficult for him to assess. Within broad cloth categories, a wide range is available possessing quite different characteristics, and consumers are given no guidance as to which of the cloths are most likely to fulfil his requirements. In the absence of such guidance he will tend to choose the cheapest cloth which is about the right weight and which has an acceptable design. The consumer may attach importance to other characteristics such as wearing quality, crease resistance, crease retention and stability, but as he is given little information on these points they cannot affect his basic choice. The result is that there is little incentive for a manufacturer to devote resources to ensuring that his cloth possesses these qualities, since there is no way in which his product can command a price premium.

The problem then is to inform the consumer about the relative qualities of cloth. Two recent developments provide opportunities in this field; firstly the International Wool Secretariat has recently declared its intention is setting up such standards and associating them with the Woolmark. Thus companies producing Woolmark cloths are given a ready-made solution to this problem, of which they should take full advantage. Second, the recent Trade Descriptions Act provides a framework within which definitions for such terms as 'non-iron' and 'permanent press' may be established, which again will provide standards which can be exploited by manufacturers.

In the light of these developments it is recommended that the industry should observe the establishment of such standards and remain aware of the opportunities which they create. If it becomes desirable for the industry itself to establish other standards, then suitable arrangements should be made.

## 15.5 Channels of distribution

In Articles 3.4 and 3.5, the distribution channels used by the industry were discussed. It is now necessary to consider how these channels may best be used in the future. The choice of the most suitable channels to be used by a particular company will depend on its size, its range of products, the degree of specialisation which it employs and the services which it offers. In most cases the choice will be affected by the comparative cost of the channels available, and upon their relative effectiveness in producing orders. In the case of those products for which the demand is highly price-sensitive, the cost of the marketing channel may be vital, but for products with a high fashion content the effectiveness of the marketing channel is likely to be much more important than its cost.

It is generally accepted that the maximum profitability is achieved in any market by the use of an aggressive sales force. In the home market, apart from very special cases, it is important that this sales force should be an employed force rather than an agency, since otherwise a great deal of the impact on the customer may be lost, partly through lack of understanding between the principal and his agent and partly because of the difference in their motivation.

Ideally, this argument is also true in export markets, but there are a number of reasons why the agency system is generally employed overseas at present. Nevertheless, the importance of aggressive selling still remains, which implies that overseas agents must be thoroughly trained to understand fully their principal's marketing policies.

It has been pointed out that in marketing fashion goods, cost may be of relatively minor importance when compared with effectiveness. This is especially true in the context of using an overseas sales agent. It must be appreciated that the services provided by an agent are likely to be directly related to his level of remuneration. This must be borne in mind when negotiating the level of an agent's commission, since be is likely to give most emphasis to obtaining orders for those products for which his commission is highest. If a high rate of commission is to be agreed, however, it becomes even more important that the agent should be properly selected and also that his performance should be carefully monitored. This in turn will require a greater number of visits by company representatives to ensure adequate communications. But also, as mentioned in Article 3.5, while the export agent is the permanent representative in the market he cannot replace, or work really effectively without, occasional visits direct by his principal to his customer.

One of the reasons why overseas agents are generally preferred to direct selling in export markets is that few companies can sustain sales levels large enough to justify permanent direct representation in any one market. Because of the important advantages which can be achieved through direct selling, it is necessary to consider methods of achieving a large enough concentration of sales to make direct selling viable. Three such methods are available: first, geographic concentration of sales, which will be discussed in the following article; second, integration between companies producing comparable products, and third, the establishment of joint marketing organisations.

Certain difficulties are inevitable in attempting to set up joint marketing consortia, partly because there is no real central authority and partly because the member companies are likely to have conflicting motives. For these reasons marketing consortia have tended to prove troublesome in most cases when they have been attempted, and they are not recommended for the wool textile industry except for particular short-term objectives.

One method by which these difficulties can be overcome is through the establishment of an independent marketing company which is fully autonomous. Whilst it is owned by a group of manufacturers, it is nevertheless free to develop as a trading company without interference. Such a company is likely to become little more than another merchant, as it would be free to disregard the products of its owner companies. Few benefits would, therefore, be enjoyed. It is possible that a compromise arrangement could be found which would avoid the problems of the marketing consortium and yet still maintain a measure of control. It is recommended that a new company should be set up on an experimental basis within the industry through the sponsorship of a group of manufacturers. The new company would be free to conduct its own affairs in all respects save two. Firstly, it would be restricted to selling only to specified export markets, and secondly it would be constrained to procuring its cloth from its owner members. The company should remain free to seek competitive quotations from companies within the group or even to decline to buy any one company's products. Since the new company will be exclusively a marketing organisation it could only succeed if the necessary marketing talents exist within it, and it is, therefore, considered essential that the company should be built up around a man with established talents in this field. An alternative method of establishing such a company would be to acquire an existing merchant and reframe the terms of reference.

The function of merchants and the services which they provide have been discussed in Article 3.4, where the point was made that most merchants provide services of their own in addition to constituting a marketing channel. The extent to which merchants are used in the future will tend to find its own level according to supply and demand, but certainly their value to the industry should be recognised and their use should therefore be encouraged where appropriate.

The option of integration between companies as a measure of strengthening representation and increasing the available market share in an export market, or in the home market itself, is discussed in Article 18.2. Suffice to mention here that the development of the marketing strength and the acquisition of marketing outlets and skills is a prime cause of many take-overs; and, as shown in Article 15.2, fragmentation of capacity is a major cause of the weak selling posture of the wool textile industry. Furthermore, particular marketing strategies such as those described in Articles 15.3 and 15.4 are most easily adopted by individual companies if those companies are large and already have a significant market share.

### 15.6 Geographic concentration of sales

This article is concerned with another method of obtaining sales levels in a particular export market which are large enough to sustain the costs of direct selling. The advantages to be enjoyed are best described by considering the shortcomings of the agency system, which are as follows:

(a) Most agents represent several firms, and therefore cannot devote the same attention to the products of an individual company as would a company sales office;

(b) An agent's remuneration is directly related to his turnover, and he will, therefore, tend to emphasise the products which will sell most easily. This is particularly important where there is a large price difference between the products of different companies which are represented;

(c) Although the agency system at its best may be reasonably satisfactory, it is often difficult to find a good agent;

(d) The feedback of market intelligence is likely to be fuller and more forceful from a sales force than from an agent.

Sales levels of individual companies to particular export markets could be increased if companies were to specialise to a much greater extent in supplying particular geographic areas. Apart from the general benefits of direct selling discussed above, certain particular advantages could be achieved by companies producing woollen or worsted fancy cloths by a concentration on areas with a common design requirement. These advantages are likely to be greatest where design requirements of different areas are most distinct, where the cost of designing for export markets is high, where production for export markets has been largely in small batches, and where exclusivity is not generally required. The apparent increased vulnerability to market changes should be combatted by the more positive selling and closer contact with the market. The essential aspect of export marketing, in fact, is that it should consist of deliberate marketing policies aimed at producing a stated volume of sales at a required level of profitability. Export markets should not be pursued haphazardly, or as an effort to get rid of surplus production.

### 15.7 Service to customers

It has been said that the corner-stone of successful marketing in wool textiles is to have the right product at the right time, a statement which indicates the benefits which can arise from a company's ability to offer quick delivery. The long programme of seasonal activities described in Article 3.7 exists because of the present structure of the industry and in particular because of the system of trading between sectors. Customers would certainly prefer to delay their buying decisions so that they could be made closer to the retailing season, particularly where there is a high fashion element in the finished garment. If weavers were able to offer significantly shorter delivery periods their competitive position would be greatly improved, especially in Western European markets where, apart from tarriffs, delivery periods represent the greatest obstacle to United Kingdom exports. Their ability to meet the demand for repeat orders in other markets would also be improved.

Three main methods are available by which faster deliveries could be achieved. First of these is the adoption of standards for intermediate products and the provision of stock services associated with this. Recommendations in this field have been made in Article 15.4 and these are expected to decrease delivery times for the majority of tops and yarns and for the few standard fabrics with little design content.

The second recommendation which is expected to give rise to faster delivery is the increased use of package dyeing described in Chapter 13. This type of dyeing is already widely used by Western European producers and this is a major reason why the British industry has great difficulty in exporting to these markets. There are, of course, certain limitations imposed by the adoption of package dyeing. Exact shade matching is made more difficult although this disadvantage is probably more serious where commission dyers are used than where the dyeing plant is under the weaver's control. Certainly the importance of precision in shade-matching in commission terms can be over-estimated. A second disadvantage of package dyeing is that its use limits the type of design which can be achieved; for this reason few continental weavers use package dyeing for more than about 70 per cent of their output, which enables them to maintain flexibility in design. This limitation can also be overcome to a certain extent by the use of multi-fold twisting. While there is considerable resistance in the British industry to the introduction of package yarn dyeing, four points should be borne in mind:

(a) As shown in Article 13.4, it is recommended that 80 per cent of the industry's products should still be coloured at other stages in the mid-1970's;

(b) That the existence of more package dyeing capacity will still permit the accustomed practices and qualities to be obtained, where necessary and economic, on the more traditional plant;

(c) That, as stated in Article 15.1, unnecessary emphasis on quality standards observable only by the producers is a severe handicap to marketing and to raising profitability;

(d) That while the British industry can export most easily the products which it alone can produce, it should also be competitive in the type of products made and sold profitably by its direct competitors abroad.

The third method which could in theory be used to improve delivery times is through vertical integration of companies. It has been suggested that this would permit better production control and hence avoid delays. While this may be true, vertical integration would also tend to decrease motivation towards providing rapid service. This tendency is illustrated by the fact that a commission operator will often respond more quickly than will a large company's own production department. Since the development of standards and the wider use of package dyeing are expected to decrease delivery times, widespread vertical integration cannot be recommended on these grounds alone.

### 15.8 Pricing policies and conditions of sale

The prime object of a company's pricing policy should always be to maximise profit rather than to fill an order book. This object can only be achieved if the costs involved in production and in providing a given level of service are thoroughly understood, and, as was mentioned in Article 2.7, the industry is far from strong in this respect. The weak selling position of many companies in the industry often results in orders being accepted on terms which represent a loss. Few companies operate costing systems in sufficient detail to identify these orders; improved cost accounting is, therefore, most strongly recommended.

Although most companies give small discounts for quantity these are generally regarded as incentives for large orders rather than as true reflections of the high cost involved in producing small quantities. In addition to the recommendations of an earlier article that order size is a characteristic in which companies should specialise, many companies would benefit from a critical examination of just how worthwhile their small orders are.

The 'on-call' system is generally accepted as being against the interests of the industry. It is a service usually provided free of charge, of which customers are quick to take advantage. It is recommended that individual firms should establish the true cost of the system and insist on appropriate premia. There are cases in which the customer genuinely needs to delay delivery as, for example, when colouring instructions can only be given as fashion trends develop; in such cases the provision of the on-call service may be to the advantage of the supplier since it permits the customer to place an early order for undyed material. Even in this case, however, where the supplier is keen to offer the service, it remains important that he should be aware of the cost involved.

The quotation of discounts for early payment of accounts is another field in which awareness of the costs involved is essential. Many companies allow terms which give a positive encouragement to customers to delay payment of their bills. Such companies are, in fact, giving cheap credit to customers while paying higher interest rates on their own loans. It is recommended that companies should adopt a more rational approach which would tend to attract customers who were prepared to pay quickly while discouraging the late payers.

Another service offered to customers in order to obtain orders is the supply of sample lengths. The provision of these lengths can be extremely costly and again manufacturers should understand the costs involved in obtaining particular orders including all costs down the processing chain.

Most of the comments above are directed at the individual firm. Implementation of the recommendations would be eased, however, if a strong lead were given by some central body. The limitations of the scales of discount published by the Trade Terms Organisation have already been mentioned in Chapter 3, and it is most important that these scales should be updated. It is difficult to over-emphasise the harm which can be caused by a central body publishing discounts and the like which are inappropriate.

The points made above lay a great emphasis on costs. This does not imply that accurate costing is all that is required for an efficient pricing policy. Of equal importance is an understanding of the potential value of the product or service to the customer. The actual level of a negotiated price will always depend, to a large extent, on the individual skills of buyer and seller in the bargaining situation, combined with the amount of intelligence about both businesses which each of them possesses.

### 15.9 Use of advertising and promotion

Article 3.8 gave details of present expenditure on advertising and promotion in respect of wool textile products. It was noted that, apart from specialist sectors such as hand knitting yarn spinners, companies within the wool textile industry accounted for only a very small proportion of the total. The main reason for this situation is that the industry produces what is in effect a raw material to the clothing and knitwear industries and thus has difficulty in communicating directly with the consumer. This difficulty is exaggerated by the customer industries themselves, since most clothiers or knitwear producers are anxious to identify products with their own name, and thus resist attempts at branding by the cloth manufacturer or spinner. If wool textile companies were very much larger than they are at present they might have the resources to support a sustained promotion campaign and thus break down this resistance as the man-made fibre producers have done. This is another reason for certain companies to consider integration, but apart from these it must be accepted that advertising and promotion by individual companies within the wool textile industry is likely to remain largely confined to limited trade advertising and public relations.

The opposite extreme to individual company advertising is advertising by the industry as a whole, or by its major sectors. The main limitation of this approach is caused by the very wide range of qualities produced. Industry-wide promotion must necessarily be applied to all products in this range, with the consequence that it is of greatest value to producers of the lower qualities. Manufacturers of the high-quality and more expensive products are reluctant to subscribe to promotion of this kind, as it associates their products with those of lower quality. Limitations of this kind apply to the promotional activities carried out by the National Wool Export Corporation.

The most favourable opportunities for branding and promotion would therefore seem to centre on specific sectors of the industry whose products are sufficiently compatible to justify a joint approach. Promotion of Harris Tweed is a notable and successful aspect of this approach, as is the work of the Scottish Wool Textile Promotion Council. In contrast, the failure of the British Wool Textile Promotion Council may be quoted as an example of the difficulties which arise in attempting to promote too broad a range of products.

Another example of successful promotion of sectoral interests is the work of the International Wool Secretariat. Indeed the objects of the International Wool Secretariat can be very closely identified with the needs of the raw material preparation and combing sectors of the industry, and it is unlikely that these sectors could add significantly to the work already being done in this field.

It is suggested that further opportunities do exist for successful sectoral promotion and it is recommended that companies within the industry should consider whether, by grouping with companies in a similar trade to their own, successful branding and promotion could be carried out. One example of such a group where opportunities certainly exist is Huddersfield Fine Worsteds. It would not be too difficult to identify the firms within this sector so that demarcation is unlikely to be a problem. A suitable approach would be for all Huddersfield Fine Worsted manufacturers to co-operate in a scheme to educate the public about their products, to brand all cloth of this kind, and possibly to provide some promotional support aimed at the general public. All garments made of this cloth would be clearly identified by labels. It is unlikely that such a scheme would meet with undue resistance from the clothing industry. Customers would have no reason not to take advantage of the Huddersfield Fine Worsted label. However such a label would not include the name of the individual manufacturing company, since this would restrict the customer's flexibility of supply. The scheme could operate on a relatively small budget.

One further example may be given of sectoral promotion on a rather wider basis. The decline in the share of the fabric market foreseen for woven cloth could be limited to some extent by promotion of woven products in general. One method would be to establish a journal devoted to the woven products of the industry and directed mainly at the professional buyers such as the makers-up and retail outlets. Such a journal would increase the general awareness of the products of the weaving sector, and give the woven product an image of its own. In this context its effect would be the same as that provided by Jersey Magazine for the jersey knitting industry. Such a journal could be established as a profit-making enterprise, entries in which would be paid for by the manufacturer concerned. The weaving sector could certainly benefit by devoting more effort to the techniques available for improving public relations. Useful publicity can be obtained very economically by using press handouts, cultivating fashion editors, and so on.

It is interesting to note that some cloth merchants are beginning to advertise and brand with some success. These companies have some advantage over firms in the wool textile industry, partly because they are closer to the final consumer, and partly because they tend to be bigger companies with greater resources. A joint marketing company such as that proposed in Article 15.5 would enjoy the same advantages, so that such an organisation might well use advertising to some effect.

It has been suggested that attempts should be made to carry out promotion of garments made from wool textiles in collaboration with the clothing industry. It is felt that such a scheme would suffer from the same disadvantages as industry-wide advertising given above, and there would also be considerable administrative difficulties arising from the differences in emphasis which the two industries would wish to make in the promotion material.

### 15.10 Product diversification

One of the points made in Article 15.1 was that the wool textile industry has in the past tended to confine its marketing to a traditional (though wide) product range. This product range has been selected more in relation to the skills and plant available within the industry than to the requirements of its markets. The general product concept has been 'wool textiles', although man-made fibres have now become accepted in cases where the ultimate product is of the traditional kind. Because of this concept, certain possible avenues for diversification have not been exploited by the industry in the past.

In seeking opportunities for diversification, it is generally to a company's advantage to identify any contiguity which exists between the present business and the new business to be absorbed. Such contiguity may arise from the use of the same production facilities or the same management or manpower skills, or from common distribution channels or ultimate customers. Factors of this kind give a diversifying company an advantage over potential competitors who have no comparable contact with the business, but are merely setting out to exploit a market opportunity.

In the wool textile industry, the case in which most advantages are likely to exist is the possibility of manufacturers or spinners producing knitted fabrics. The fact that many makers-up already use both woven and knitted fabrics suggests that wool textile manufacturers, having established relationships with such customers, should have an advantage over other interests in penetrating this market. Similarly, the fact that many worsted spinners already provide the knitters with raw material and in some cases have established direct contact with the users of knitted fabric, provides an incentive for them to diversify into the knitting field. The extent of these advantages is difficult to assess. On the one band the view has been expressed that woven and knitted products differ to the extent that two independent sales forces would be required. On the other hand the fact that some customers use both products in a similar way suggests that at least from the customer's point of view the products are not so different. If this latter view is exploited, then the introduction of a range of knitted fabrics would cause little more disruption to the sales force than the introduction of a new range of woven fabrics, although new technical knowledge and sales points would have to be learnt. Of course, the adoption of knitting is likely to involve the sales force in approaches to a number of new customers, but any good sales force is always seeking new business in any case. On balance it would seem that marketing benefits could be enjoyed and the rapid growth foreseen in demand for knitted fabrics makes this field an attractive one for diversification.

A comparable opportunity exists for the wool textile industry to diversify into the field of modification of continuous filament yarns. This course of action may be more difficult than the move into knitting, as the cooperation of the man-made fibre producer is essential. Again there is a high degree of contiguity with the worsted spinners, whose customers for spun yarns are expected to consume a growing proportion of modified continuous filament yarns in future, and some spinners have indeed already started a movement into this field.

Finally, the implications of Article 12.5 should be the concern of every company in the wool textile industry. Just as companies who diversified into the production of knitted goods, polyester/modified rayon trouserings, or denims, seized a major share of the fabric market, and forced an increased measure of over-competition on the remaining traditional suppliers, so there will be companies in the next decade who will foresee the next dominant method of fabric manufacture and further compress the opportunities available to their erstwhile competitors. It is the object of this report to suggest ways by which companies in the wool textile industry can be in a position to take the lead themselves.

### 15.11 Buying and merchanting of raw materials

There has been considerable evidence throughout the course of this study of the inadequacies in the traditional methods of classifying wools. The traditional single-term description (64's etc.) has increasingly come to be regarded as insufficiently precise to permit the efficient use of modern plant and, more important, the production of tops, yarns and fabrics of consistent quality. The flexibility imputed to the old system is rightly seen as encouraging the use of substandard materials, leading in turn to production difficulties in later processes; while the pressure on converters' margins is strong this tends to be a natural development, but it is urged that the industry turns to greater precision, quality definition, and control throughout the conversion process. This entails, therefore, the encouragement of research into, and adoption of accurate repeatable methods of measuring and describing the fibre quality (in terms of length, diameter, crimp and tensile strength etc.) with the object of minimising the subjective element in fibre description. The industry should seek ways of establishing a sound and rigorous set of standard wool qualities, possibly acting in concert with IWS (and through them the growers), the IWTO, the British Standards Institute and the British Wool Marketing Board, for example, to ensure that the standard was satisfactory both to growers and converters of wool alike.

This apart, there is little that can be done to better the present system of buying wool. The slight economies of scale that could be achieved by large-scale buying resulting from integration (at least of buying requirements) of topmakers and woollen yarn producers, or from the reliance by the industry on fewer, and, therefore, larger buyers, are probably offset by the resulting loss of precise 'feel' for a client's requirements that a buyer normally has, although such 'feel' should become less significant in future. Increased co-operation in buying does, however, permit more research to be done, not only in terms of inspection of wool but, possibly more important, in terms of forecasting future supply and demand fluctuations.

The industry appears to be gradually abandoning the practice of making profits purely out of speculation in wool, in favour of maintaining a steady throughput on plant and minimising losses due to variations in wool prices by means of futures. All schemes for the more artificial stabilisation of wool prices have so far aimed to benefit the grower only, and the suggestion was made early in this study that it might be to the benefit of the industry for a central wool-buying body to be set up, possibly by the government, to provide a financial buffer between the international open market for wool and the industry. Apart from the organisational defects of such a scheme, which could be no better at avoiding stock losses than the industry as a whole and could, therefore, be extremely costly, it is felt that the removal from the British industry of some of the normal supply and demand forces could only lead it to uneconomic and uncompetitive activity.

As in the case of wool-buying, it is clear that there are certain economies of scale in purchasing man-made fibres, chiefly in the fact that substantial quantity discounts are available for regular large buyers. Companies with small requirements of man-made fibres should, therefore, endeavour to obtain their supplies in a group, or by using as a merchant a larger company with which good relations can be established, provided this does not harm the relations between the major company and the fibre supplier. The development of large buying groups by massive horizontal merging is not thought to be a sufficient argument by itself for such structural upheaval, but could be an additional reason for companies to integrate. The formation of large companies with a major proportion of their business in man-made fibre conversion could then provide a logical opportunity, and possibly adequate capital, for expansion further upstream into man-made fibre processing or even production.

# Chapter 16 Manpower and management policies

## 16.1 Future manpower requirements

A forecast of the industry's future manpower requirements is needed as a basis for planning recruitment, training and management policies. The major determinants of such a forecast are the type of plant installed, the allocation of manpower to plant, the production batch sizes, the efficiency of the operatives and management, and the average number of hours worked per week by production workers. To synthesise a manpower forecast from predicted basic data of this sort would need extremely detailed knowledge of present and potential practice in each process. The method used, therefore, has been to analyse the industry's existing manpower, to observe the changes which should take place by the mid-1970's, and to assess the effects of these changes on manpower.

The most fundamental factor affecting manpower is the forecast of changes in production levels, as discussed in Article 8.6. From this, and the proposed moves in some sectors towards more capital-intensive plant (as recommended in Chapters 9 to 13), it is possible to derive the numbers of personnel needed in each sector under the prescribed conditions, but with present manpower productivity. These figures are then modified to take account of probable changes in the average number of hours worked per week, changes in productive efficiency assumed to be achievable through work-study and improvements in manning standards, and the changes in distribution of men and women in each sector. The distribution of non-production personnel is then estimated separately, to give the total personnel requirements of the main production sectors.

It is extremely difficult to estimate the potential improvements in manpower productivity in each sector. Work-study has been used extensively in the combing sector, but investigations during this study suggest that there is still room for improvement in many companies. The other sectors have made less use of work-study techniques and there can be little doubt that significant gains in productivity can be achieved. For example, productivity gains in the Fine Huddersfield Worsted companies were approximately 5 per cent in the first year after their inter-firm comparison was carried out, and most of this can be attributed to increased operator efficiency. Recommendations in earlier chapters concerning specialisation and standardisation of products could have important effects, especially in the worsted spinning sector, and, to a lesser extent, in woollen spinning, dyeing and finishing. For the purposes of this forecast, improvements in operative efficiency have been estimated separately for each sector, ranging from 2 to 6 per cent, the average for the industry being about 5 per cent by the mid-1970's. These estimates are thought to be conservative, and the industry's targets should certainly be more ambitious. Certainly management and unions should combine to ensure that the industry mans the plant according to the best international standards, such as set by the USA or Japan.

The average working week for men in the industry in 1967 was 48 hours. It is considered that the trend to fewer working hours will continue and it has been assumed for this purpose that the average for men will be 44 hours per week by the mid-1970's. The average for women was about 38 hours per week in 1967. This is less than the current 'normal hours' of 41½ and also less than the 40 hours which will become 'normal' in May 1969, by agreement between the NAUTT and the Employers' Council. This is due to the flexibility of women's working hours in this industry, and it has been assumed that the average will remain constant at 38 hours per week.

Table 16.1 shows the resulting forecast of manpower in the main sectors. The two sectors in which the most important changes are foreseen are the worsted and woollen manufacturing sectors, the figures for which include burling and mending. Both sectors should have reduced their total employment by over a third by the mid-1970's, largely as a result of the changes to pirnless looms advocated in Chapter 12, and the consequential improvements in plant productivity and manning standards. The only sectors where employment should increase are in the relatively small activities of semi-worsted spinning and knitting. The total reduction should be about 16 per cent of the present manpower; this represents a lower rate of annual reduction than has been experienced by the industry since 1961, so that redundancy should not prove to be a problem.

Table 16.1 – Manpower required in the mid-1970's

| | | *Percentage changes by mid-1970's* | | | | | |
|---|---|---|---|---|---|---|---|
| *Sector* | *Present manpower* | *Due to change in output* | *Due to plant product-ivity* | *Due to manpower product-ivity* | *Due to shorter working hours* | *OVERALL* | *Manpower in the mid-1970's* |
| Top production | 13,100 | +3 | −14 | −4 | +4 | −11 | 11,600 |
| Worsted spinning | 41,600 | +8 | −23 | −6 | +4 | −17 | 34,700 |
| Woollen yarn production | 26,200 | 0 | −3 | −5 | +6 | −2 | 25,600 |
| Semi-worsted yarn production | 1,000 | +146 | −19 | −2 | +5 | +130 | 2,300 |
| Worsted weaving | 21,300 | −1 | −40 | −4 | +5 | −40 | 12,800 |
| Woollen weaving | 26,700 | −10 | −20 | −4 | +2 | −32 | 18,100 |
| Knitting | – | – | – | – | – | – | 2,400 |
| Dyeing and finishing | 9,600 | +5 | −13 | −5 | +6 | −7 | 8,900 |
| Others | 4,600 | 0 | −2 | −5 | +5 | −2 | 4,500 |
| WHOLE INDUSTRY | 144,100 | – | – | – | – | −16 | 120,900 |

## 16.2 Changes in shift systems

Chapters 9 to 13 contain recommendations concerning the plant which should be operated in each of the main production sectors in the mid-1970's. The recommendations also cover the utilisation of new and old plant as measured in operating hours per week. Based on these types of plant and the need for multi-shift operation on the new capital-intensive plant, it is possible to estimate the proportions of men and women required by each sector, these being shown in Table 16.2.

Table 16.2 – Distribution of men and women

| | *Present* | | | *Mid-1970's* | | |
|---|---|---|---|---|---|---|
| *Sector* | *Men* | *Women* | *Percentage women* | *Men* | *Women* | *Percentage women* |
| Top production | 10,900 | 2,200 | 17 | 10,300 | 1,300 | 13 |
| Worsted spinning | 16,600 | 25,000 | 60 | 11,500 | 23,200 | 67 |
| Woollen yarn production | 16,700 | 9,500 | 36 | 19,300 | 6,300 | 25 |
| Semi-worsted yarn production | 1,000 | – | 0 | 2,300 | – | 0 |
| Worsted weaving | 8,600 | 12,700 | 40 | 4,800 | 8,000 | 63 |
| Woollen weaving | 9,900 | 16,800 | 63 | 8,000 | 10,100 | 56 |
| Knitting | – | – | – | 1,300 | 1,100 | 46 |
| Dyeing and finishing | 7,500 | 2,100 | 22 | 7,000 | 1,900 | 21 |
| Others | 3,400 | 1,200 | 26 | 3,400 | 1,100 | 25 |
| WHOLE INDUSTRY | 74,600 | 69,500 | 49 | 67,900 | 53,000 | 44 |

There are a great number of different ways in which shift systems can be arranged to meet the requirements of particular establishments and their employees. No attempt is made here to prescribe any chosen systems, but an estimate of the overall effect of the proposed changes is needed for later articles in this chapter. The approximate proportions of normal day-shift working (as opposed to all other multiple day or night shifts) to meet the requirements of Chapters 9 to 13 are given below:

Table 16.3 – Shift working in the mid-1970's

| Sector | *Production manpower in the mid-1970's* | *Normal day-shift (per cent)* | *Multiple-shifts (per cent)* |
|---|---|---|---|
| Top production | 9,500 | 30 | 70 |
| Worsted spinning | 27,700 | 60 | 40 |
| Woollen yarn production | 21,600 | 50 | 50 |
| Semi-worsted yarn production | 2,100 | 20 | 80 |
| Worsted weaving | 11,200 | 70 | 30 |
| Woollen weaving | 14,100 | 70 | 30 |
| Knitting | 2,100 | 20 | 80 |
| Dyeing and finishing | 6,200 | 75 | 25 |
| Others | 3,600 | 90 | 10 |
| WHOLE INDUSTRY | 98,100 | 58 | 42 |

Thus it is estimated that about 42 per cent of all production employees will be on some form of multi-shift working in the mid-1970's, representing about 30 per cent of the total employment of the industry. About 20 per cent of the industry's production personnel are on some form of multiple-shift system at present, and the proposed increase is therefore in the region of 3 per cent per year. The industry's Trades Unions are already well aware of the need for increases in shift working and discussions with the Employers' Council have already started. The sociological and other difficulties in making widespread changes of this sort are appreciated, but it is felt that the proposed rate of change is feasible and in conformity with the proposed numbers of men and women. Generally, in each sector, new high-productivity plant will need to be operated on a multi-shift basis; low-productivity plant requiring higher manning will remain on single-shift operation, using female labour wherever possible.

The figures above show a very high proportion of multi-shift working in the two rapidly-growing activities of semi-worsted spinning and knitting. This is necessary to obtain a proper return on the new plant and to compete with similar plant operating outside the industry. A high proportion is also shown in the top production sector. This sector already tends to work its plant on multiple shifts, and investment in new French combs and convertors will cause a further increase. Relatively small changes are proposed in the weaving sectors, where the majority of looms will still be of conventional types, large productivity gains being achieved with relatively small numbers of pirnless looms. The figures shown for the weaving and knitting sectors include mending, which will continue to employ a large proportion of women working day shifts.

Women are prohibited by law from working throughout the night, and a considerable proportion of the women in the industry are part-time workers. The operation of new plant on rotating three-shift or four-shift systems will, therefore, generally be restricted to men, but many establishments will continue to have sufficient flexibility to operate single- or double-day shifts, and, therefore, to continue employing women if they wish to do so.

### 16.3 Manpower recruitment and training policies

The forecast in Table 16.1 shows a decrease in the total manpower of the industry of about 16 per cent by the mid-1970's. Table 16.2 shows the numbers of men and women in each sector compared with the present; the corresponding annual rates of change in each sector are indicated in Table 16.4.

Table 16.4 – Future manpower trends

| | *Average annual percentage change* | |
|---|---|---|
| *Sector* | *Men* | *Women* |
| Top production | −0·9 | −6·8 |
| Worsted spinning | −5·1 | −1–1·2 |
| Woollen yarn production | +2·6 | −5·6 |
| Semi-worsted yarn production | +22·0 | 0 |
| Worsted weaving | −7·4 | −6·2 |
| Woollen weaving | −3·2 | −6·7 |
| Knitting | large increase | large increase |
| Dyeing and finishing | −1·1 | −1·6 |
| Others | 0 | 0 |
| WHOLE INDUSTRY | −1·5 | −4·0 |

If these figures are compared with the record of recruitment and turnover given in Article 2.2, it is apparent that the annual reductions are all very much less than the recent annual turnover rates. It was also shown in Article 2.1 and in Figure 2.2 that at least 15 per cent of all men and women now employed in the industry will be over retirement age by 1975. It may be concluded that the reductions envisaged in the numbers of women employed will result in no redundancies and can be accommodated by normal wastage and less-intensive recruitment. In those sectors where the number of men should fall, the same applies, but the need for more men in certain sectors, and the need for almost as many men in total, will call for more effective recruitment. As apparent turnover rates are currently high, it is also important that more effective steps should be taken to retain employees.

The Yorkshire and Humberside Economic Planning Council recently attempted a forecast of the working population of the region, and of the number of jobs in 1971. This survey predicted a surplus of 4,000 men and a shortage of about 40,000 women compared with the jobs available for them in 1971. This is complementary with the proposed changes in the wool textile industry and it appears that this trend will facilitate these changes. However, in the same way that unemployment varies now from town to town within a region and skills tend to be concentrated locally, changes in the employment pattern can be expected to have widely differing effects between and within regions. About a third of the women engaged in the industry are married, and, besides these, the labour force generally is reluctant to travel far to work. Some transfer and retraining will be possible to redistribute manpower between sectors in the industry; this will only partially solve the problem and positive recruitment policies will undoubtedly be needed, especially as the total available labour force will be reduced after 1971 due to raising the school-leaving age.

High turnover and difficult recruitment in the wool textile industry have been attributed to a number of factors. Of these probably the wage rates are the most important. Average hourly earnings of men were shown in Article 2.3 to be nearly 20 per cent below the average for all manufacturing industry, and it is partly to compensate for this that the average number of hours worked in the industry is significantly higher than the national average. If men are to be attracted in competition with other industries in the same areas or elsewhere, the average hourly earnings will have to be nearer to the national average. The Government's attempts to control wage increases and the industry's low profitability impose serious limits on any large increases in wage rates in the near future. However, introduction of new plant and methods of of working should provide scope for wage increases associated with improved productivity in many sectors. It is recommended that all parties to productivity negotiations should be mindful of the need for substantial increases in earnings without excessive increases in production costs.

While improved earnings prospects will have a considerable effect on recruitment, it is unlikely that the industry will be in a position to compete with other employers by this means alone, and action is needed to improve its image as an employer. Companies vary widely in their ability to attract recruits but it is clear that the industry as a whole needs to give attention to the image it presents, in terms of outward appearance of mills, working conditions, safety, training and promotion prospects. It has been shown that, in most cases, the building of new mill buildings cannot be justified financially while space is available in existing buildings. Most companies should, therefore, improve the appearance of their buildings by attention to details rather than by rebuilding. If the industry can change its image from that of obsolescence and decline to one of stability, historic importance and strength, the nineteenth-century buildings may be no disadvantage.

Interior working conditions are very variable. The majority of establishments comply wholeheartedly with the requirements of the Factories Act 1961, but those which do not are damaging the industry's reputation. In any case the Act's requirements are little better than minimal, and Government is thought to be considering new safety, health and welfare legislation to replace the Factories Act 1961. It would probably be advantageous to the industry, taking a long-term view, if inspectors were given rather greater powers of enforcement in the event of infringement, and it is recommended that the industry should give support to the proposals contained in the consultative document prepared by the Ministry of Labour in December 1967. This applies particularly to paragraphs 204 to 207, dealing with the question of enforcement. Apart from the few substandard establishments, many companies could take steps to improve the interior appearance and comfort of mills and offices at modest expense, or to provide amenities such as canteens. Many accidents could be avoided by means of suitable training, machine layout and guarding, and effective reduction in noise levels can often be achieved fairly easily. Companies should seek advice on these subjects and make improvements wherever possible.

Training and career prospects are linked as the latter is often impossible without the former. It has already been pointed out in Article 2.5 that many establishments with fewer than a hundred employees provide little if any formal training, and about 70 per cent of all establishments are in this size range. Apprenticeships are long, and employment in technicians' and overlookers' posts is almost exclusively restricted to those who have completed apprenticeships. It is recommended that the industry should regard career development as an essential part both of the long-term future and of personnel management; certainly it is a most important factor in recruitment of young people. Apprenticeships should be examined and, where possible, should be greatly reduced in length. Block and day release facilities should be more freely available for further education and training, and managements should take advantage of the services provided by the Training Board. Such expense as is not recoverable as grants is likely to be recovered quickly in increased efficiency and reduced turnover.

### 16.4 Improvements in company controls

The present use of management control systems in the industry has been reviewed in Article 2.7. A few companies are well managed, but it is apparent that the majority of companies are lacking to some degree in effective control systems. For example, about 30 per cent of all production companies have no cost accounting and, of those which have, many do not use cost information effectively for control purposes. Only about half of all companies use monthly profit/loss information or other financial figures for control purposes. Relatively few companies are familiar with the range of scientific management techniques which are available.

Small companies are usually unable to employ specialists in operations research, market research, methods study, cost accounting and so on on their permanent staff. Some control functions such as production scheduling, stock control and overall co-ordination are often within the capacity of the chief executives of small companies without the use of formal systems. Less than 30 per cent of the establishments in the industry employ more than one hundred employees each, at which size the employment of one or more professionally-qualified staff could be expected. However, the senior managements of small companies should be familiar with the uses to which such specialists can be put and should expect to obtain their services from time to time on a consultancy basis, either as an aid to planning or as a periodic control. It appears that small companies in the industry are not only the weakest in the use of control systems, but are also the least frequent users of such management training and professional services are as available to them.

Questionnaire returns indicate that a typical establishment employing two hundred personnel of all sorts would have about thirty non-production and administrative staff. At this level of operation, especially if multi-shift working is practised, ad-hoc unsystematic management is likely to yield poor results. A well-managed establishment of this size and larger should aim to have an integrated control system incorporating sales programme, production control, stock control, cost control, financial control, and forward personnel plans.

Notwithstanding the difficulties in forecasting in this industry and the wide variances that are likely, sales forecasts and programmes or budgets are essential as a basis for planning buying, recruitment, investment in plant, and cash requirements. Systematic analysis of variances may lead to progressive improvements in the accuracy of the forecasts.

Production control involves scheduling of work, preferably with the help of modern techniques such as linear programming and certainly with the help of standard or calculated cost information. It also involves the recording of production performance for comparison with standards and the generation of actual costs.

Stock control must be fully integrated with buying, selling and production scheduling if optimum results are to be obtained in stocks and work in progress. Where designing is an important part of a company's marketing function, it is essential that it should be co-ordinated with the control system. Many companies are now carrying excessive stocks as a direct result of failure to control the design function.

Whether a standard costing system is used or not, costing requires close co-ordination with production control. The system should be capable of producing detailed cost information in advance for different batch sizes of each product, with realistic allocations of overhead costs, to provide a sound basis for pricing. Sales and production budgets can then be produced and, hence, periodical financial budgets and cash forecasts. Regular comparison of actual performance with the budgets provides for updating and for control action. It is recommended that every establishment should aim to have, as its minimum control requirement, monthly actual profit or loss information, not more than two weeks after the end of each month. This should be supported by periodical reports on stocks, production, deliveries and personnel. The degree of detail and formality will depend largely on the size of the establishment.

In view of the multiplicity of products sold by many companies and the quantity of control information which must be processed in an integrated control system in a medium or large sized company, mechanical or electronic data processing is usually an economic necessity. Only the largest companies can justify owning their own computers, but the trend to increasing company size, and the need for more sophisticated control systems are bringing an increasing number of companies into the size which can justify the use of computer bureaux. It is not recommended that the industry should consider setting up its own computer bureau, as the services it needs are likely to be available more competitively from commercial suppliers. The National Computing Centre, WIRA, the Management Services Centre, and the computer manufacturers are all developing systems and programmes designed for the industry, and these will be available to both large and small firms.

### 16.5 Improvements in company organisation

It was shown in Table 4.1 that 44 per cent of all establishments in the industry employ no more than 32 people each. Almost all of these are non-integrated, private companies. At this level of size, company organisation can be fairly informal, as there is seldom any confusion concerning the roles of managers, especially when they are also shareholders. Concentration on a single process enables the chief executive to control buying, production and selling personally, in addition to maintaining personal contact with all his employees. Fragmentation of this kind, which has typified much of the industry in the past, has resulted in the tradition of principal-to-principal trading which is still very common. While the establishment remains small and specialised, this type of management can be effective and economical. Motivation is generally strong and human relations excellent; the principal problem is often one of succession. No change in organisation can be recommended, but the managers of such establishments are advised to allocate a proportion of their time to their own development. They should also be ready to seek professional advice from time to time and especially if they contemplate growth or diversification; firms of auditors are one source of such assistance which could be used to greater advantage than at present.

About 27 per cent of all establishments and 25 per cent of integrated establishments each have between 33 and 100 employees. In this size, many of the characteristics of small establishments such as motivation, good man-management and informality can still be found. But generally the task of management must be shared, and a typical establishment of 75 personnel has 12 to 15 non-production employees. It is important that their roles should be clearly understood, and some functional delegation of responsibility and authority becomes necessary. The introduction of simple and effective control systems becomes important.

The remaining 29 per cent of all establishments employ between 101 and 3,200 each, and about half of these are integrated to some extent. Most of these employ fewer than 320 personnel but, throughout the whole range, there is a need for formal structures and systems with clearly defined roles and relationships. A number of integrated establishments are now organised departmentally, each production department being responsible for its own personnel and administration. While it is often advantageous to allocate responsibility for costs to process departments (and this should be accompanied by delegation of authority in proportion to the responsibility), there are strong arguments in favour of functional organisation outside the process departments. Marketing is such a vital function that it should generally be the responsibility of a specialist. Since it often involves the complementary functions of designing, buying of raw materials and selling of products, it is usually advisable to allocate this responsibility to a senior executive at or near director level. With increasing size, the other principal functions of production, personnel management and finance are also likely to require specialist appointments at a senior level. The chief executive may be able to carry out one or more of these functions or they may be combined in another senior person, but the functional responsibilities require definition.

Shift working is becoming increasingly important in this industry, and changes in management organisation are needed when an establishment adopts shift working. Production managers are able to refer all serious problems to higher authority when a mill is only operating a day shift, but multi-shift operation calls for delegation and acceptance of responsibility at shift management level. More formal control systems are needed, and the reduced level of communication between senior management and production workers is likely to call for up-grading of the personnel function and, in large establishments, the employment of a specialist personnel manager.

### 16.6 Management of multi-establishment groups

The size distribution of multi-establishment organisations was shown in Figure 4.1(b); about half of all such organisations employ more than 100 personnel. However, the management structure most appropriate for these organisations depends as much on the numbers of their establishments, the geographical proximity of their establishments to each other, and the nature of their activities, as on their collective size.

Detailed analysis of questionnaire returns shows the following average numbers of establishments in the multi-establishment organisations in each size category:

| *Organisation size (No. of employees)* | *Average establishments per organisation* | *Average establishment size (No. of employees)* |
|---|---|---|
| 0 – 3 | 2·0 | 1 |
| 4 – 10 | 2·4 | 3 |
| 11 – 32 | 2·3 | 10 |
| 33 – 100 | 2·4 | 30 |
| 101 – 320 | 2·5 | 90 |
| 321 – 1,000 | 3·9 | 180 |
| 1,001 – 3,200 | 7·6 | 300 |
| 3,201 – 10,000 | 15·0 | 450 |

In all sizes, therefore, up to 320 employees, most of these groups consist of only two establishments and very few have more than three. Generally they are situated close to each other and are managed with little formality from one office. In larger organisations, the average numbers of establishments and the average sizes of establishments increase progressively and greater formality of management organisation is required, both within and between establishments.

In independent establishments or very small organisations, management is generally very highly motivated by profit, often by identity of management and ownership. Even where managers are not owners, in small concerns there is typically close involvement with success or failure, and this is communicated to all levels of employees. In larger multi-establishment groups identification of ownership with management is normally impossible, and problems of motivation and communication become increasingly serious.

There are two distinct methods of managing groups, viz. quasi-autonomous establishments and functional control. In the wool textile industry a great deal of autonomy is commonly given to the managements of establishments, the central control function being concerned largely with finance. This arrangement has certain important advantages; mill management enjoy the involvement, responsibility and motivation of almost independent command, and they are also free to act decisively and quickly to meet changing circumstances. In organisations that are subject to the influences of fashion, the latter factor may well be paramount. Many of the present groupings appear to have occurred mainly for financial and ownership reasons, rather than to obtain the potential advantages of integration in the areas of production and marketing, and this pattern of management reflects this.

However, there are a number of benefits potentially available from group control on a functional basis from a single headquarters. These include potential economies in buying, marketing and stockholding, and there are a few groups in which rationalisation of production between establishments has provided or could provide substantial process economies. This arrangement requires more elaborate control systems and higher overhead costs, and thorough analysis of the cost benefits available is needed before establishing this type of structure. These overhead costs need not be excessive, especially for the larger groups, and it is recommended that consideration should be given to increasing the functional co-ordination and control in groups, while retaining as far as possible the motivation and accountability of mill managements. It is of course not possible to make firm recommendations on a single course of action, as the best management structure for each group depends on personalities, products, geographical situation and a number of other factors.

Figure 16.1 shows a management structure for large multi-establishment organisations in the industry, which may be modified to suit particular circumstances. The black lines represent the normal pattern of management responsibility and the red lines indicate functional co-ordination. Article 16.5 has already discussed the subject of management within each establishment. Some measure of functional co-ordination and control of groups is considered essential; acquisition with minimal management of a number of establishments is arguably the worst possible arrangement, as the motivation of local management is weakened and nothing is provided in compensation. However, central co-ordination depends on the associated establishments having either a vertical relationship or complementary product ranges. Associations of establishments supplying different markets in terms of products provide few, if any, advantages of integration. A large group could, of course, consist of two or more sub-groups supplying different markets and these should each be managed as a separate co-ordinated organisation. In general, random mergers of companies which have no common markets are not recommended.

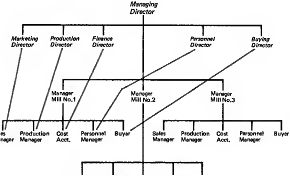


FIGURE 16.1 – ORGANISATION OF A MULTI-ESTABLISHMENT GROUP

## 16.7 Recruitment and training of management

In Article 2.6 the opinion was expressed that, although the industry is strong in man management and experience, it is heavily geared to the management of small establishments and is weak in professional qualifications and modern techniques. Later chapters have shown that the industry needs to undergo a number of changes and, in particular, it has been recommended that sections of the industry should be substantially re-equipped during the next few years. There will be continuing opportunities for small specialist companies but many non-specialist companies should grow to obtain economies of scale.

Companies installing new, modern plant will need to operate on a multi-shift basis, and this will call for new types of management staff. Responsibility and authority will have to be delegated to shift management and formal control systems will become necessary. Motivation and communication with all levels of employees become serious problems when shift systems are installed, and the personnel management function needs to be given more formal recognition. Large establishments are likely to need trained personnel managers. It is significant that, in spite of apparent economies of scale in management, large companies often fail to be more profitable than smaller companies, and this can frequently be attributed to failure to plan and re-organise the company during the growth period, with consequent failure of communications. Production expertise and entrepreneurial flair will continue to be needed, but these qualities must be supplemented by specialist training in social and management sciences.

There are two ways in which the industry can acquire the management skills it will need in future. Firstly, it would be possible to recruit experienced staff from other industries. Companies whose management structures offer attractive career prospects should have little difficulty in obtaining skilled men in this way. Infusions of ideas and techniques from other industries can be stimulating and valuable; establishments contemplating growth, change of shift systems or mergers are likely to benefit from engagement of staff from industries where large size and shift working are commonplace. Many of the specialised skills such as cost accountancy, personnel management and operations research are of universal application, and in these skills breadth of experience is more important than a detailed knowledge of textiles. It is recommended that vacancies at all levels, including board level, should be considered eligible for 'transplant' appointments of this sort, and that medium-to-large companies should actually give preference to candidates from other environments for a proportion of their staff recruitments in the next few years.

The engagement of experienced staff should be accompanied by recruitment of a proportion of trainee managers with high academic qualifications. Fewer than 7 per cent of such qualifications as exist in the industry are university degrees. A wide spread of talents is desirable and promotion of suitable managers through supervisory levels from the shop floor is to be encouraged, but the industry should ensure that it also secures an element of academic excellence.

Besides engaging both experienced and trainee staff, the industry should devote much more attention to the training of existing management. Article 2.5 points out the extreme paucity of managers who have received formal training and the insignificant expenditure by the industry on management training. The Training Board is now giving increasing priority to this subject and there are many centres all over Britain where courses and seminars are held in the whole range of management topics. A number of these are specially designed for top management, who need to be aware of the uses of scientific techniques without needing to be able to apply them personally. It is inevitable that the best and most promising managers, and the managing directors, can seldom be spared readily, but it is strongly urged that all companies, of all sizes, should arrange for every member of the staff to be subjected to periodic training or exposure to new ideas. Such training and management development requires deliberate planning, and companies are advised to allocate resources and time as a matter of policy. A provision of one to two per cent of management's time to its own development, amounting to not more than five days per manager per year, would be a reasonable minimum target for most companies.

For this proposal to be successful, companies must be prepared to invest in their own management, and there must be some central organisation to run the courses and disseminate information about them. Already the Training Board is placing increasing emphasis on supervisory and management training; Management Services Centre also runs courses in many management subjects; but most of what little management training is undertaken is performed in an unco-ordinated manner outside the industry. Which body organises the training is not particularly important, provided such training is available.

Whilst the Training Board is the obvious vehicle, its relationship with the industry is at present equivocal, and this may well hinder its efforts to encourage management training. Although seven employers and seven Union members sit on the Board they do so as individuals, not as industry representatives. The industry as a whole, therefore, feels that it has little influence on the Training Board, and in turn the Board receives little credit for its endeavours. To overcome this unfortunate circumstance, it is recommended that the Delegation and Employers' Council should request a series of meetings with the DEP to see whether, within the existing Training Act, some accommodation cannot be arrived at.

Management Services Centre, on the other hand, bears a justifiably excellent reputation in the industry, but would need very great expansion and changes in terms of reference were it to cater for even a modest proportion of advanced management training. With some six thousand managers each spending (say) four days per year on courses, there would need to be permanent lectures to some 100 participants. It is therefore recommended that management training needs should be met partly by attendance on external courses such as are provided by universities, business schools, the Administrative Staff College, Henley, and the various commercial enterprises; the remainder should be met by a separate management training college. This should be organised as a pan-textile enterprise, in conjunction with the other textile industries, and it is recommended that exploratory discussions with the appropriate bodies be started. Appropriate subjects for the courses given to senior management would include marketing (including market research), long-range company planning, computer applications, management controls, management and cost accountancy, operations research, production and stock control, critical path programming and personnel management.

### 16.8 Use of advisory services

The annual expenditure by the industry on its central services has been outlined in Article 4.6. This is of two kinds; firstly, there are the contributions which are either in the form of statutory levies or federation subscriptions. After deducting training grants which are returned to the industry, the expenditure of this sort amounts to about £624,000 annually. Secondly, there are costs incurred voluntarily for specific and exclusive services. Most of the expenditure of this kind is represented by the fee income of the Management Services Centre, but smaller amounts are also spent on fees to WIRA and to outside consultants. The total annual expenditure on specific services of this sort is probably not more than £150,000, of which the Management Services Centre accounts for £85,000.

At less than 0·5 per cent of its total added value, the industry's expenditure on representative and advisory services is far too low. The representative structure is such that the industry has good control over the direction of its central services and it should be prepared for carefully planned increases in expenditure. It is suggested that an annual expenditure of £1 million by the mid-1970's would be a reasonable target. It is recommended that immediate steps be taken to set up a market research and intelligence service, possibly as a service department to the Delegation. This service would perform the same function as the work of Chapters 3, 6, 7 and 8 of this report, continuously monitoring important changes in markets at home and overseas. This service could usefully be accompanied by fundamental consumer research with a view to orienting correctly product promotion, to provide the basis for research programmes into the provision of new desirable product characteristics and possibly test-marketing such products, and to help in the identification of product standards which were understood by consumers. These two additional services could be provided at a cost of £10,000 to £20,000 per year each. It could also usefully experiment with techniques of forecasting movements of fibre prices.

Besides the central services which provide information to all subscribers, the industry should increase its use of exclusive consultancy services such as are provided by the Management Services Centre. There are many occasions, particularly during periods of change within companies, when specialised jobs of work need to be done for which the right skill is not available or cannot be spared. Subjects such as work study, market research, project planning studies and installation of management control systems are of this sort, and it is common experience that expenditure on such projects is rapidly recovered in improved working. Consultants with extensive experience in the industry are to some extent carriers of ideas and techniques from one company to another. It is a mistake to resent this, as companies using these services generally acquire far more knowledge than they give. In inter-firm comparisons, it is usually found that all the participating companies benefit by the pooling of knowledge, and gain significantly over similar companies which neither give nor take information in this way.

It is appropriate that a large proportion of the industry's consultancy work should be entrusted to the Management Services Centre which has much specialised experience. Indeed the range of services provided by Management Services Centre should be broadened progressively to include all aspects of management consultancy in which specialisation in wool textiles is valuable. Much of the confidence felt in MSC by client companies stems from the non-profit-making basis for its fees and it is recommended that this should continue. However, specific projects to develop techniques for use in the industry should be facilitated, preferably by separate budgeted allocations for each project from central funds.

For certain consultancy projects, where the work is concerned with product or process development, or where general experience in other industries is needed, there will continue to be opportunities for WIRA and for external consultants. In any case, companies should feel free to change their advisers from time to time according to their effectiveness, and to ensure that they secure the most up-to-date advice. The next few years will see such changes in the industry that almost all companies will be affected, and a great deal of professional advice is likely to be needed. It is recommended that the industry's total expenditure on such services should increase considerably, and an annual expenditure in the region of £250,000 is thought to be a reasonable level for the mid-1970's. Management Services Centre could expect to account for about half of this.

WIRA's budgeted requirements are increasing at the rate of about 5 per cent per year although, on the present basis of assessment, levy income will fall. Even with the revision to a basis of wages and salaries instead of employment, as recently requested by the Delegation, income may do no more than keep pace with inflation.

The recommended approximate level of overall expenditure by the industry on technical services in the mid-1970's is as follows:

| | |
|---|---|
| WIRA | £330,000 |
| WIBS | 15,000 |
| MSC | 125,000 |
| Market research | 15,000 |
| Consumer research | 15,000 |
| External consultants | 50,000 |
| | £550,000 |

# Chapter 17 Financial policies

## 17.1 Future capital requirements

Chapters 9 to 14 described the process developments recommended for the industry over the next seven years. In the main these consisted of the replacement of existing types of plant, often operated on single shift, with new machinery to be run on multi-shift operation. Examples of such replacement investments are the substitution of ring spindles for cap and mule spindles in the worsted spinning sector, and the replacement of many of the industry's existing automatic and non-automatic looms with pirnless weaving machines. It should be borne in mind that many of these replacements will in fact occur as a result of dynamic companies expanding their existing multi-shift activities, and driving out of business the less-efficient companies operating the obsolescent plant. This will create a temporary problem of apparent over-capacity, but should not lower the returns available on the new investments, since in all cases they are such that the new plant has economic advantages over the existing plant, even when the latter is bearing no capital charges. Certain recommendations have also been made concerning the investment in new plant to cater for projected increases in output of converted tops, worsted yarns, semi-worsted yarns and knitted goods. In Table 17.1 the capital estimated to be necessary for the implementation of all these recommendations is set out for each major process activity.

**Table 17.1 – Capital required for developments**

| *Sector* | *Capital required (£ m)* | | *Less: Investment grants (£ m)* | *Net capital needed (£ m)* |
|---|---|---|---|---|
| | *New plant* | *Replacement plant* | | |
| Combed top production | – | 1·9 | 0·3 | 1·6 |
| Converted top production | 0·1 | – | – | 0·1 |
| Worsted spinning | 5·0 | 5·0 | 1·8 | 8·2 |
| Woollen yarn production | – | 4·6 | 0·8 | 3·8 |
| Semi-worsted yarn production | 0·8 | – | 0·3 | 0·5 |
| Worsted weaving | – | 8·2 | 1·4 | 6·8 |
| Woollen weaving | – | 8·5 | 1·5 | 7·0 |
| Knitting | 2·0 | – | 0·4 | 1·6 |
| Dyeing | – | 2·2 | 0·4 | 1·8 |
| Finishing | – | 1·5 | 0·3 | 1·2 |
| TOTALS | 7·9 | 31·9 | 7·2 | 32·6 |

Estimates have been made of the working capital required to support the investment in plant to increase output, the working capital providing necessary stocks, spares, and covering general commissioning charges. It is assumed that no working capital will be required to support plant replacements, the stocks for these being the same as those for the replaced plant. To indicate the total net capital requirements, it has been assumed that normal capital grants of 20 per cent of the cost of all plant will be available, but in view of the delay normally expected in the receipt of these, their value has been discounted for one year at 12 per cent. The grants relating to the semi-worsted yarn capacity have been taken as those appropriate for Development Areas, where such investment should occur, according to the recommendation in Article 11.6.

It can be seen that the major investments required by the industry are £10 million to be spent on ring systems in the worsted spinning sector, nearly £17 million for automatic and pirnless looms in the manufacturing sectors, and nearly £5 million on replacement plant in woollen spinning. Allowances have been made for investment in new dyeing capacity, and also for new finishing plant, particularly in order to cope with increased quantities of knitted goods. Of the investment required by the combing sector, just over half will be required for new carding sets, and the remainder for scouring sets and French combs. All estimates of costs have been based on current manufacturers' quotations for plant prices, allowing for delivery, installation and commissioning and also, where necessary, making full allowances for any ancillary or supporting plant which may be required to render the major investment effective. However, each item in Table 17.1 is subject to errors of estimation, so that total capital requirements should be regarded as being between £30 million and £35 million, net of cash grants. Furthermore, individual companies will be able to find consolidating and balancing investments which have of necessity fallen outside the scope of this report which could probably bring the total investment required by the industry up to around £40 million net.

An estimate has been made of the speed at which each of these investments should be made. It is realised that a single investment shown in Table 17.1, such as that of £8.5 million on woollen manufacturing plant, will in fact consist of a large number of individual companies making their own investment decisions, and be balanced by their own and other companies' decisions to discontinue operation of obsolescent plant. In general, it would be best for all the plant replacement investments to be effected at once, to force obsolescence immediately on most of the apparent excess capacity. All the new plant should be installed at once to take immediate advantage of market opportunities. However, this would throw a severe strain on both the industry's financial resources and on its labour relations, so some modification of this rate of expenditure has to be made. Nevertheless, it is recommended that the investments in knitting, semi-worsted yarn production, tow converting, and finishing plant should be made immediately, as should all the replacement investment in worsted cards. Other replacement investments made early should be 60 per cent of the total in worsted spinning systems, 40 per cent of that in pirnless looms, and one-third of that in automatic looms, in woollen spinning plant, and in dyeing plant. About 20 per cent of the new worsted ring spinning and drawing systems could also be installed now.

This 'immediate' investment totals just over £15 million net of cash grants, which, allowing for ordering and delivery, should have been incurred by the end of 1971. In the following two years, the remaining pirnless weaving machines should have been introduced, as should have a further 40 per cent of the new worsted ring systems; a further third of the automatic looms, woollen spinning plant and dyeing plant should also have been installed to replace existing equipment. This will entail expenditure by the end of 1973 of a further £11 million. All the remaining investment, totalling £6 million, should be made by the end of 1975. The programme of expenditure, making allowances for cash grants discounted for one year's delay in payment, is shown in Table 17.2

This required capital expenditure is only that necessary to fulfil the recommended investments detailed in Chapters 9 to 14. A substantial further sum is bound to be required as a result of individual companies making further improvements to their plant in the light of this report and of technical and market developments in general. This further sum cannot be quantified with any precision, but could obviously raise significantly the total money to be spent; a total of £40 million is therefore envisaged.

It is not expected that there will be any major industrial investment in new buildings, although there will undoubtedly be considerable modifications and improvements to existing buildings as discussed in Article 14.5. These are, however, likely to involve much

Table 17.2 – Phasing of capital requirements

| *Sector* | *Cumulative capital requirement (£ m)* | | |
|---|---|---|---|
| | *By end of 1971* | *By end of 1973* | *By end of 1975* |
| Combed top production | 1·1 | 1·3 | 1·6 |
| Converted top production | 0·1 | 0·1 | 0·1 |
| Worsted spinning | 3·5 | 5·8 | 8·2 |
| Woollen yarn production | 1·3 | 2·5 | 3·8 |
| Semi-worsted yarn production | 0·5 | 0·5 | 0·5 |
| Worsted weaving | 2·7 | 6·4 | 6·8 |
| Woollen weaving | 2·5 | 6·0 | 7·0 |
| Knitting | 1·6 | 1·6 | 1·6 |
| Dyeing | 0·7 | 1·2 | 1·8 |
| Finishing | 1·2 | 1·2 | 1·2 |
| TOTAL | 15·2 | 26·6 | 32·6 |

smaller levels of expenditure, which need not be shown here. The other major area of capital spending is likely to be on computers. Such investments will, however, be made by a few large successful companies, and it would be misleading to present the capital required as an industry-wide opportunity.

### 17.2 Finance available to the industry

Having determined the capital investment required by the industry to achieve the desirable levels of efficiency, profitability and competitiveness, it is now necessary to determine the ability of the industry to raise the requisite finance. Two qualifications should be introduced, however, before the calculations are shown. Firstly, just as the investments to be made are, in fact, sectoral guidelines to be followed, in aggregate, by many individual competitive company decisions, so the power of the industry to raise finance is dependent on the individual companies in the industry (discussed in Article 17.6), and an industry-wide study is not the most effective method of assessing this aggregate power; nevertheless, as will be shown later on, the industry-wide method does, if anything, underestimate the industry's profitability, and consequently its fund-raising ability. Secondly, whereas all the developments so far discussed and recommended throughout this report have been made with regard to major product sectors of the industry, the financial analysis of the industry, as given in Chapter 5, was of necessity undertaken according to company division, which involved considerable degrees of overlapping of process and product sector boundaries. Thus, for example, there are companies in each of the combing, worsted spinning, worsted spinning and weaving, and integrated divisions, who operate combs and sell tops. Whereas those companies in the combing divisions have no further processing activity, those in the other sectors do.

Despite the fact that the industry's capital-raising power is the sum of the individual companies' ability, an attempt has been made to determine broadly how much new debt capital could currently be raised by each division. This has been done primarily by direct analysis of Chapter 5, with additional reference back to the financial questionnaire returns. Table 17.3 presents the basic method and conclusions of this operation.

The power of a company (and, it is assumed, of a division) to raise new capital is a function of its profitability record and of its existing capital structure. The function is not precise for an individual company, and even less so for a group of companies, and potential suppliers of finance will take into account many other factors. For the purposes of this exercise, however, it has been assumed that the profits record and the current liabilities structure provide the basic indicators.

The average gross profit of each division for the three years 1965 to 1967 is shown, the results having been converted into constant-price terms before averaging. The capital structure of each division is shown, broken down into equity, long-term fixed interest capital and net short-term fixed interest capital. Equity includes issued equity capital and all capital and revenue reserves; with long-term fixed interest capital, chiefly comprising debentures, minority interests and future tax provisions, are aggregated preference shares, taken to be equivalent to fixed interest debt; short-term fixed interest loans include bank liabilities, but have been adjusted to allow for cash in hand and for the balance of the debtor: creditor accounts

Those columns of Table 17.3 showing elements of capital employed and the total are the sums of positive numbers for all individual companies. The column showing profits, however, contains substantial negative elements where companies have had losses on reserves, and so on. Comparison of profits with capital employed tends, therefore, to give a slightly pessimistic view of the industry's attractiveness from the point of view of potential investors. In assessing extra capital availability, therefore, reference was made to the questionnaire returns of each division to ascertain the true total profits of the positively-profitable companies. It was then assumed that divisions could support total debt capital to the extent that their gross profit covered total interest payments five times, aggregate interest rates on all debt being taken at 7 per cent. From this it can be seen that only seven divisions of the industry could raise new debt capital, the total realisable being £38 million. The gearing of the sectors, if this new debt were raised, would then be as shown in the final column.

It can be seen that the apparent availability of new debt finance allows some leeway compared with the estimated capital requirements, leaving some provision for the raising of temporary funds prior to receipt of cash grants. It is also extremely sensitive to interest rate changes, an increase of aggregate interest (including debt raised long ago) to 8 per cent (from the 7 per cent assumed above) lowering the available new debt to £29 million; it also raises the industry's gearing to over 40 per cent compared to the national average of around 20 per cent. To gain more reserve capacity of capital, therefore, the industry must either increase profitability or raise new equity capital. Of these, the former is not only probably more acceptable to the industry, but is also likely to be achieved anyway as a result of following the recommendations of this study. It will be seen that the gearing of most divisions after raising new debt, as shown in Table 17.3, is still quite low by individual company standards, and that further fixed interest capital would be reasonable were profits able to cover the higher interest charges. Since Table 17.3 is based on historical profit records, therefore, it is recommended that the industry proceeds to raise as much new debt capital as necessary and, by implementing this report, to endeavour further to increase its attractiveness to investors. The raising of new equity capital has not been put forward as a general recommendation, since it must be essentially a matter of policy for individual companies. There are, however, undoubtedly companies which could increase their equity.

Further methods by which finance can be found by individual companies, to cater, as it were, for the 'extra' capital investment discussed in Article 17.1, are suggested in Article 17.6. Two further broad areas, however, should be mentioned: stock reductions and adjustment of trade debts. It was shown in Article 14.1 that a reduction in the stocks held by the industry of some £25 million could be achieved. This sort of achievement would clearly release funds for more productive employment, and immediate implementation of the stock-reducing suggestions should, therefore, occur. It was shown in Article 5.2 that the industry has been a net creditor consistently over the last five years, by £10 million or more annually. With the eradication of the causes—and, therefore, of the

Table 17.3 – Borrowing power of the industry

| Division | 1965-67 average gross profits (£ m) | Present capital employed (£ m) |  |  |  | Extra loans supportable (£ m) | Resulting gearing (per cent) |
|---|---|---|---|---|---|---|---|
|  |  | Equity | Long-term loans and preference | Net short-term and bank loans | TOTAL |  |  |
| Combers and recombers | 2 | 16 | 6 | 14 | 36 | – | 55 |
| Worsted spinners | 11 | 55 | 13 | 7 | 75 | 12 | 37 |
| Woollen yarn producers | 3 | 11 | 5 | 3 | 19 | 1 | 45 |
| Worsted weavers | 1 | 8 | 1 | 2 | 11 | – | 27 |
| Woollen weavers | 1 | 5 | 0 | 0 | 5 | 3 | 38 |
| Integrated worsted organisations | 2 | 10 | 3 | 4 | 17 | – | 41 |
| Integrated woollen organisations | 7 | 35 | 7 | 2 | 44 | 11 | 36 |
| Woollen and worsted organisations | 10 | 44 | 11 | 17 | 72 | 2 | 40 |
| Dyers and finishers | 5 | 14 | 4 | 4 | 22 | 6 | 50 |
| Rag and waste processors | 1 | 4 | 0 | 0 | 4 | 3 | 43 |
| Scourers and carbonisers | 1 | 2 | 1 | 2 | 5 | – | 60 |
| Merchants and topmakers | 2 | 15 | 6 | 17 | 38 | – | 61 |
| WHOLE INDUSTRY | 46 | 219 | 57 | 72 | 348 | 38 | 43 |

psychology—of weak selling, it is suggested that the industry should make every effort to obtain more trade credit than it gives. This step could yield over £10 million liquid funds annually.

Since, therefore, availability of finance is unlikely to act as a brake on potential investment, it is finally necessary to resolve the discrepancy between those activity sectors requiring funds, and those structural divisions able to raise capital. Whereas companies in spinning and weaving activities will in general easily find suitable investment opportunities, it can be seen that companies currently in the commission dyeing and finishing division, and in the mungo and shoddy-producing division, have fund-raising ability in excess of their specific investment requirements. It is, therefore, recommended that companies in these divisions with the ability to raise funds should do so, and should diversify their activities, to ensure their own profitable future growth as well as the necessary development of the industry as a whole. Such diversification could be undertaken either as original investment or, more likely, by take-over of companies possessing the necessary skills, experience or marketing outlets.

### 17.3 Government incentives to investment

Although it was suggested in the previous article that, from a broad industrial viewpoint, it seemed unlikely that there will be a serious shortage of money available for investment, it is nevertheless imperative that the industry proceed with the recommended programme of capital expenditure at the earliest possible opportunity. The need for this swift action is not only because of the necessity for the industry to become internationally competitive and efficient, but also because the result of most of the investment will be the enforced obsolescence and inability to compete of companies unable or unwilling to make the recommended improvements. This will then eliminate a substantial part of the excess competition and, particularly when undertaken in conjunction with the recommendations in Chapter 15, establish the industry on a sound commercial basis.

Nevertheless, as indicated in Article 15.2, it requires more than obsolescence to persuade the obstinate private businessman to go out of business if he is prepared to spend more money supporting unrealistic prices. Furthermore, the economic comparisons of Chapters 9 to 14 cannot pretend to be an accurate representation of every company's costs, although they are reasonable comparative indicators. The economic advantages of investment will, therefore, be substantially strengthened, and the motivation to make these investments speedily heightened, if the industry could for a short period be afforded special investment incentives by the Board of Trade similar to those currently available in Development Areas. The following pattern is suggested:

(a) an investment grant of 40 per cent on any investment in plant, to be applicable until the end of 1973;

(b) this investment grant to be continued at the lower rate of 30 per cent until the end of 1975;

(c) the industry to revert to the normal pattern of investment grants from 1976 onwards.

Suggested administrative aspects of the scheme are that the Central Federation of the industry proposed in Chapter 18 should define for the Board of Trade those companies which should be regarded as being within the industry and qualifying for the grants, and should also have the power to advise against giving the grant on any investments which are contrary to the principles behind the recommendations of this report, whether in nature or scale. It is likely that, to avoid widening the scope of this proposal too far, only investments in traditional processes of the industry, in which it is competing with potential importers, should be considered; investment in tow conversion and knitting should be undertaken by companies in genuine competition with other British companies, without the benefit of the preferential grants.

The cost to the Government of this scheme would total £14·8 million, compared with £8·2 million assumed on the normal investment grants basis assumed in Article 17.1, The result of this extra £7 million expenditure would be to encourage swift action and, by lowering the return which need be expected on the new investments, it would augment the economic forces driving out the obsolescent capacity. It would enable the industry to act as though it were in a Development Area, but to be able still to call on the pool of skilled labour and the easily-available services in its traditional locations. It would also increase the industry's ability to compete with imports and to export profitably. It is, therefore, most strongly urged that Government extend the investment grants scheme in this manner immediately.

## 17.4 Decapitalisation of sectors

It has been shown that much of the investment recommended for the industry–such as that in pirnless weaving machines, ring spindles, and high-temperature dyeing plant–is, when operated on multi-shifts, economically so superior to the old plant it replaces that it automatically eliminates any excess capacity. In some sectors, however, such as combing, there is a less clear-cut choice, and excess capacity will persist. Similarly although the installation of modern equipment to undertake the longer-run bulk production is in all cases economically sound, the older plant is still viable for shorter-run products for which even more excess capacity will have been created. It is essential, therefore, to consider whether there are ways in which companies can actually eliminate such surplus productive plant rather than by adopting marketing measures proposed in Chapter 15, simply exacerbating the problem in ever-dwindling sectors of the market. The problem must also be faced in the long-term, since declining trends in markets are hardly likely to end in the mid-1970's.

Figure 17.1 illustrates the normal effect of over-capacity on pricing policy and hence on the profitability of the companies affected. The two histograms represent the production costs of a number of companies, that on the left representing their basic operating costs, and that on the right their comprehensive costs, including their normal profit element. The shape of the histograms reflects the distribution of the various companies' costs between those particularly efficient firms and those with particularly high costs. In a normal competitive situation, when demand is growing and requires constant additions to capacity, the market price will tend to settle between lines A and B (depending on the rate of growth of demand), the lower limit of which is sufficient to encourage investment by the efficient firms and to provide reasonable profits for all but the least competitive. In an excess-capacity situation, however, provided companies cannot jointly regulate price or supply, the price will tend to be forced downwards to position C, where no company earns its normal profit, and some companies, indeed, do not even cover their basic operating costs. At these levels it is to be expected that the high-cost producers will at some point cease production, the consequent reduction of capacity possibly permitting a rise in price. If, however, capacity is reduced to equal demand so that there is no further discouragement to the price rising to level B again, then the further investment which may be raised could once again create excess capacity. Schemes to decrease capacity should not, therefore, be so successful that they encourage such a price rise.

Clearly, the major problem stemming from the existence of excess capacity is that of fragmentation of control, since the decision to close down a proportion of plant by definition removes the capacity surplus. The reduction of a sector's productive capacity can, therefore, firstly be achieved by the elimination of the multiplicity of control, which could in turn follow from widespread merging of companies horizontally throughout the sector. While this could, in theory, succeed in improving control over supply once there were only a few companies left in business, the initial stages of acquisition and of merging control would show so little immediate return, particularly in an industry already as deeply

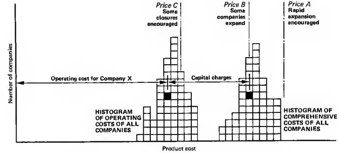

Price C
Some closures encouraged
Price B
Some companies expand
Price A
Rapid expansion encouraged
Number of companies
Operating cost for Company X
Capital charges
HISTOGRAM OF OPERATING COSTS OF ALL COMPANIES
HISTOGRAM OF COMPREHENSIVE COSTS OF ALL COMPANIES
Product cost

FIGURE 17.1 – EFFECT OF OVER-CAPACITY ON PROFITABILITY

fragmented as the wool textile industry, that there might be little motivation for a company to undertake such a step. In addition, it is probable that other effects of the process, such as destruction of individuality and variety, would seriously undermine the advantages of this scheme for the industry. Nevertheless, it is in the best interests of any good companies to reduce over-capacity which threatens them, and take-over may be the best means of achieving it.

Inter-company co-operation is the next possible method of controlling capacity, and can arise in two major forms: either the companies within the sector can agree, possibly through the auspices of a Federation, to cut supply, or they could use a Mutual Association to reduce plant capacity. Both these courses of action are theoretically sound, but intensely difficult to put into practice.

The combing sector, consisting of comparatively few companies which have a tradition of co-operation based probably on specialisation, established the Woolcombers' Mutual Association in 1933. This Association has had a fair degree of success in reducing excess capacity and raising available returns, but over the last few years has been unable to keep up with the required rate of decline of plant capacity. It is clear that the WMA has been able to achieve its success generally through the active co-operation of the majority of companies in the sector, but that it has been essential that it offers more incentives to support the operation than the mere elimination of over-capacity. The three further advantages which WMA offers are:

(a) the Board of Trade tax certificate, permitting companies' contributions to it to be offset against tax liability;

(b) the opportunity to Association members only to purchase plant in good condition which the Association may acquire, provided they eliminate equivalent obsolescent capacity;

(c) an agreement made with integrated companies from whom the Association purchases combs that a substantial part of their future requirements for tops should be met by Association members rather than by companies outside the Association.

Despite these three benefits, the Woolcombers' Mutual Association succeeds primarily because the majority of the companies in the woolcombing sector want it to, and are prepared to support it. Its achievements so far have been made over a period of 35 years, during which contributions to it have accumulated steadily. Clearly, however, the nearer that companies believed supply and demand to be in balance, the more the Mutual Association would have to pay for plant it acquired, and indeed it is believed that the WMA has recently had to raise considerably its offer prices. On the other hand, no Mutual Association should attempt fully to resolve the imbalance, since to do so would permit the market product price to rise to level B on Figure 17.1 and encourage reinvestment.

It is recommended, therefore, that the activities of the Woolcombers' Mutual Association be continued and encouraged, since many Noble combs must be scrapped before becoming obsolescent. While the same condition applies to other types of plant in the industry, it is believed to be unlikely that the necessary inter-company co-operation could be found in any other part of the industry to provide the successful initiation and operation of any other Mutual Association.

A less demanding form of joint action to reduce capacity would be the decision by companies in an over-supplied sector, where more than one shift was common practice, to reduce the hours worked, cutting right back to one shift if necessary. This, like the Mutual Association approach, can only be valid if the sector concerned is one where there is no plant obsolescence. Clearly, however, such a course of action would require complete trust and mutual agreement by all the companies affected, and while this could conceivably be achieved through the offices of the appropriate Federation, it would only require one dissenting or non-federated company to endeavour to increase its turnover by means of multi-shift working for the scheme to be inoperable. It is believed to be unlikely that such a scheme would offend the Restrictive Practices Act, but an additional difficulty is that of convincing the Trades Unions that it would be in the interests of their members to permit such inter-company agreements to operate. It is not envisaged that this idea will be any more acceptable than that of the Mutual Association.

Primarily the solution to excess capacity lies with individual companies, although the central organisations and Federations of the industry should give the greatest possible encouragement to any possible joint schemes. There is no 'golden key' other than plant obsolescence, and companies which feel their profitability to be threatened or lowered by excess capacity should either adopt solutions such as those suggested in Articles 15.3, 15.4, and 15.10 or consider whether, in the long-run, some take-overs by themselves would not show adequate returns.

### 17.5 Investment appraisals

As was pointed out in Article 17.2, many of the developments and proposals made in this report relate to broad sectors of the industry within which it is realised that there is considerable variation in performance and activity between companies. It will, therefore, be the object of each company to decide precisely how the generalised forecasts and proposals should be related to its own particular environment and to make its own development plans accordingly. Nevertheless, there are certain broad rules for appraising and making investments which it is important that every company in the industry should observe. The art of investment appraisal has progressed considerably over the past few years, and it is generally recognised by British industry that methods and criteria hitherto used for testing potential investments in this country require modification in the light of modern economic techniques. In particular, whereas in the past 'pay-back' or 'average rate of return' techniques have generally been used, it is recommended that as many companies as possible should endeavour to employ discounted-cash-flow techniques, not solely because these are inherently better, but because of greater accuracy of forecasting and cost estimating which they entail. Decision-theory techniques incorporating risk analysis, preference and utility theory could be more widely adopted, in view of the high risk element involved in the industry.

Similarly, it is even more important that companies should expect and insist on an adequate return from any planned investment made in accordance with the proposals in this report. There is considerable evidence that a fair proportion of companies within the industry are in the habit of proceeding with capital expenditure with the expectation of average returns on capital of well below 20 per cent before tax. It will have been observed, however, that throughout this report the discounted cost of capital used in comparing different investments has been taken to be 20 per cent before tax, equivalent to an average gross rate of return of 25 to 30 per cent, and sufficient to provide a 12 to 13 per cent return, before personal taxation, to equity shareholders, consistent with the sort of returns they could reasonably expect on any sound investment over the last few years. In other words, the cost of capital to the company should be seen as the opportunity investment rate and, allowing for Corporation Tax, should determine the minimum return on capital in a normal year's work; companies should individually assess what their own target rates should be, and while few should accept discounted rates below 20 per cent, many companies should have target rates well above this level. To accept lower rates of return is to waste capital on inefficient projects, which will be less profitable to the company shareholders than they could reasonably expect if proper investment criteria were applied. Consequently, a company is condemned to permanently low levels of profitability, and it is probably this poor investment control within the industry which more than any other single factor has been the cause of the generally low profitability of the industry over the past few years. It should be borne in mind that the acceptance of low standards of profitability by a minority of companies permits them to expect lower prices, and therefore tends to drag down profitability of other, more ambitious companies. However, as has been shown in Article 17.1, there are plenty of investment opportunities available during the next few years at the high standards of profitability mentioned above. Companies which have investment capital available but are genuinely unable to find investment opportunities within the industry as attractive as those proposed in this report would be better advised, in their own interests and in the interests of the wool textile industry, to spend their surplus money in investments outside the industry.

### 17.6 Financial options for companies

It will have become clear that there are innumerable good investments in the industry for dynamic companies. These will include replacement of obsolescent plant, diversification, taking over companies to obtain marketing skills or liquid assets or to decrease competition, and so on. In general it is fair to say that a company which can show good profits and sound prospects should be able to raise money. The full extent of the financial options open to individual organisations is probably not, however, familiar to many companies in the industry.

As indicated in Article 17.2, the major sources of new capital should be stock reductions and fixed interest debt, and companies should assess the possibilities of increasing their debt commitments. It was pointed out that the industry's average gearing ratio is already considerably higher than the national average, but individual companies should be able to push their debt proportions well above 40 per cent, provided their earnings cover is adequate. At the present time, clearly the raising of new debt by companies in this particular industry could not be expected to be easy, but individual companies with above-average profits records and good prospects, based on policies such as those in Chapter 15, should be able, with expert professional advice, to find finance relatively quickly.

Besides the more orthodox means of raising new finance by means of debenture deeds, rights issues, and so on, all of which are, in the light of the industry's general record, likely to be difficult for many companies, there are many other sources of cash open to any firm which pursues its investment programme with sufficient thoroughness and imagination. Since most of the capital to be spent is concerned with the purchase of plant, companies should study the possibilities of acquiring new equipment by hire purchase or, preferably, by leasing. Under leasing schemes finance companies, typically subsidiaries of merchant banks or clearing banks, undertake the ownership of the plant for a specific period, the lessee company using the plant and paying a fairly heavy rental for a short period of up to 7 years, on which full tax relief is obtainable. (Typical leasing rates would cost the company 12 to 13 per cent annually net of tax.) Although this is an apparently fairly expensive means of financing, it can be preferable to the payment of an immediate lump-sum for outright purchase where cash is not available. Hire purchase arrangements tend to be less favourable, since the investment grant is obtainable only on the amount actually paid, whereas under a leasing system the finance house will have received the full grant at once, and adjusted the annual rental accordingly. Techniques such as these are essential considerations in the purchase of equipment, but it is unlikely that many companies in the industry will possess the necessary discounted cash flow and similar skills to make a full comparison, and it is recommended that they use the best professional, technical and financial advice available.

It should be pointed out that financing, as described above, tends to be available only for new plant. Finance companies are, however, also able to provide money on a mortgage or general charge basis on property already owned by industrial firms. Although the use of such assets as security against debentures or bank loans could complicate such manoeuvres, the availability of finance from these sources is also worthy of investigation.

The use of credit in the purchase of materials is already well-established in the industry, although there may be companies who are paying cash in advance of the receipt of wool when they would be better advised to pay an interest charge and let a finance house bear the main financial burden. It is equally important that companies all through the industry bear in mind that they are in business as industrialists and not as finance houses; if, therefore, they are faced with inevitable delays in receipt of payment for finished goods, the use of factoring could be a good source of cash, and, when used in conjunction with suitably realistic terms for charging late payers, need not be very expensive. Similarly, where companies cannot avoid an excess of debtors over creditors, they should investigate the possibilities of obtaining unsecured borrowings on the basis of the money owing, or of selling the outstanding debts.

Another source of funds for individual companies is the Industrial Reorganisation Corporation, which is an independent but publicly financed body. The terms of reference for this Corporation are that it may:

(a) 'promote or assist the reorganisation or development of any industry' or

(b) 'if requested so to do by the Secretary of State, establish or develop, or promote or assist the establishment or development of, any industrial enterprise'.

Under the first of these functions the Corporation regards the wool textile industry as a priority industry, largely on account of its considerable contribution to the balance of payments, particularly since there is evidence that some major customers of the industry are fully prepared to import their requirements in the event of quality or speed of delivery shortcomings of the British industry, or to provide their customers or outlets abroad with foreign materials. The IRC is, therefore, particularly interested in assisting with structural change and any resulting investment involving parts or groups of companies within the industry. It welcomes initiatives from management to discuss schemes designed to strengthen their sector of the industry, underlining again the need for companies to prepare and present their plans with the aid of professional specialists. For the scales of expenditure likely to be involved in this industry, companies should certainly take the initiative themselves, and sums even of the order of £½ million or below which are not available from conventional sources can be obtained, at reasonable terms, provided the proposed reorganisation and redevelopment:

(a) will have a significant effect on the balance of payments, leading either to exports or to import substitution, or

(b) will substantially improve the utilisation of resources, particularly capital or labour, or

(c) will result in the maintenance or development of a high level of technology in the country.

The third of these criteria being, in this industry, of limited relevance, companies should consider take-over and development schemes from the point of view of the first two criteria. It should be emphasised that the provision of financial assistance by the IRC does not imply 'back-door nationalisation', but simply that the re-emergence of a strong wool textile industry is in the national interest, and encouragement of particularly good companies within the industry is correspondingly worthwhile. It should also be stressed that any discussions with the IRC are undertaken on the basis of strict confidentiality.

A final source of cash which can be particularly attractive to private companies is to approach investment companies which are specifically interested in holding shares in small companies with good prospects, without necessarily taking control themselves. These companies—such as ICFC, EDITH, or the Charterhouse group—are frequently linked to merchant banks and, besides possessing capital themselves, can provide excellent financial advice and can assist in the public flotation of a private company if required.

In summary, it should be evident that there are numerous sources of finance available to companies, many of them involving no dilution of control, which is often a paramount consideration in this industry, and most of them at costs which are perfectly compatible with the high rates of return on which, as shown in Article 17.5, companies should be insisting for all their investments. It is vital, however, that companies take the best possible professional advice in all these matters for each specific problem, to ensure that they adopt the most appropriate means of financing. The best course is to have an independent project report prepared on any particular investment proposal, setting out and evaluating the costs and benefits of the scheme, on which the company's auditors or a merchant bank can give precise and detailed advice.

This aspect of financial policy, of using the best independent specialist assistance available, is important even for companies which cannot see a viable future for themselves. Considerable attractive investment opportunities have been shown to exist in the industry, and potential profitability, following the recommendations of this report, could be as high as in any other established industry in the country. Nevertheless, some companies will not be in a position to survive, and for them the best financial policy is to withdraw from business at the earliest opportunity before realisable assets have further declined in value.

Basically, capacity is reduced by individual companies:

(a) partially or totally diversifying the employment of their resources into other productive activities,

(b) partially reducing their capital and their available capacity,

(c) ceasing production.

The first of these three methods is the most orthodox, and is satisfactory both to shareholders and to management. It requires, however, considerable adaptability of management and labour. It is recommended, nevertheless, that as much as possible of the attractive new investment in knitting, semi-worsted yarn production and new weaving capacity should be undertaken by companies with available funds, but with current activities threatened by an excess of sectoral capacity. Such companies are by definition likely to be the more successful elements of such sectors, but appreciative that excess capacity will eventually harm them as well as their less-efficient competitors.

The second course of action, that of partial decapitalisation, can again be satisfactory to shareholders, who would have the opportunity to reinvest part of their capital, but less satisfactory to management. It also entails the availability of sufficient liquid assets to make the cash repayment, which the scrapping of redundant plant is unlikely to provide. It can be effected by forming a subsidiary company to hold the assets which are to be retained, subsequently liquidating the holding company which owns the remaining assets. It is unlikely that in the majority of cases this course of action would adequately recompense the shareholders, but the sooner it is put into effect the better is likely to be the return.

This criticism is also applicable to the third possible course of action, that of liquidating completely. Nevertheless, the partial or total liquidation of assets is bound to be more preferable when a company is in an apparently fairly healthy trading position than when it has been finally overtaken by the increasing imbalance of supply and demand. Because the courses of action suggested above are complex, and involve considerable foresight, it is recommended that one function of Federations in affected sectors should be to sponsor a central specialised professional or consulting service which would provide the requisite knowhow and advice on an impartial and confidential basis, to help companies plan and implement their responses to over-capacity. It is suggested that the fees payable to this body should be shared between the Government, the Federations and the companies concerned, each party possibly paying equal proportions.

# Chapter 18 Changes in the structure of the industry

## 18.1 Factors relating to structure

In Chapter 4 the present structure of the industry was analysed; it was seen that there are already significant trends towards fewer establishments, an increase in average size of establishments, and reductions in the proportions of small establishments and private companies. Changes such as these are the result of a number of inter-acting factors, and by examining these it is possible to indicate the ways in which the structure should continue to change. The major factors influencing structure include marketing, insofar as marketing strength, market share and bargaining power are clearly dependent to a large extent on size; management is also highly important, inasmuch as the management of large companies requires very different training and expertise from that of small. Methods of financing developments, and number of opportunities for investment, also are affected by organisation size and structure, as are the economics of production up to the point of full economies of scale. Other factors affecting structure include expenditure on research and development, stockholding, and handling and transport, all of which are of relatively minor importance in the wool textile industry compared with marketing, management, finance and production. These four major factors are discussed in more detail in the following articles.

## 18.2 Marketing pressures for structural change

Purely from the point of view of marketing strength, the ideal industrial structure would consist of a very few large organisations making the long-run products, and smaller companies set up solely for specialist short-run production. There would probably be an element of verticality among the large organisations, but primarily the industry would contain big horizontally-integrated units. Each large unit would be in a near monopolistic position in respect of its own particular products, and, given the appropriate foresight in specialisation and in diversification, there would be little danger to any of the large groups from competing products. Bargaining power would tend to be great, of course, and the prices and profitability of the industry would be correspondingly high. Linked to such a structure could well be large direct-selling units, possibly at home and in export markets, with as much information-sharing between the quasi-monopolistic companies as would be legally permitted. The making of products to stock, in order to provide a swift response to consumer demand and to provide the most economic of batch sizes, would be the general method of operation among these large organisations. The smaller specialists would be freed from the pressures of the big buyers and would be better able to charge higher prices also, their freedom from competition being fairly safe since their short-run business would be largely unacceptable to the large firms.

Such a structure clearly implies a vastly different industry from the present one, and a method and style of production unacceptable to most current operators. Nevertheless, it would be an almost inevitable consequence of aggressive marketing linked with specialisation and the recognition and adoption of standard products.

The linking of such structure with vertical integration would give organisations the ability to have at least a base-load on each processing sector's capacity secured by the next sector downstream. The ability of management in a vertically-integrated unit to have close control over production and quality right through the process would tend to be of less benefit in an industry already orientated towards product standards such as those recommended, especially for yarns and tops, in Article 15.4.

The wool textile industry is also particularly ill-suited to vertical integration because of the increasing variety of materials required at each consecutive major downstream process. Thus, for example, an integrated worsted spinning and weaving organisation would tend to make only a proportion of the yarns required by the manufacturing stage; but on the other hand, as shown in Part Three, the optimum size of the spinning section would be far larger than the minimum optimum size of the weaving section. Verticality in this industry, therefore, tends to cause considerable imbalance and to provide comparatively little benefit in the form of shared production and elimination of inter-process marketing costs, although it should be pointed out that such costs on average account for only about 0·5 per cent of the added value of a cloth at present.

The unsurpassed reputation of the British industry in world markets is due in no small measure to the large variety of distinctive 'handwritings' of fabrics produced by numerous individualistic companies, and some of the larger organisations in the United Kingdom, and particularly those in the USA, bear witness to the difficulty of maintaining diversity of product and design flair in centrally-managed enterprises. The abandonment of this individuality for the sole purpose of combatting the buying strength of, say, the multiple tailors would clearly lose the industry a major marketing weapon. Nevertheless, it is felt that on balance the adoption of the recommendations in Chapter 15, felt to be essential for the industry's future viability, should tend to lead towards a greater measure of horizontal integration, particularly in the manufacturing sector, although the industry will itself probably avoid significantly reducing the product variety noticeable by the final consumer.

### 18.3 Management and structure

Questionnaire returns have been analysed to determine the cost of management in relation to size of establishment. Positive economies were found in establishments with over 100 employees, but below this size the reverse was apparent. In either case the financial effect was small—savings in costs of management were only 1 per cent of added value when establishment size was increased from 200 employees to 500. Management costs are thus a very weak pressure towards integration.

A much more powerful influence is the fact that large and small organisations require completely different types of management, with different skills. The existing management in the industry (with some notable exceptions) is geared to small businesses, personally controlled in both production and labour aspects. The quality and skill of management in many of these companies is highly suspect. Large organisations require a much higher degree of professional management with specialised functional knowledge and experience in fields such as finance, company planning, and marketing. Thus, any transition towards a more integrated industry should only be undertaken at a pace commensurate with the industry's ability to re-train existing management and to recruit from outside.

Horizontal integration of companies under one management brings the ability to specialise and to develop a deeper understanding of specialist skills—for instance, a large horizontal company can devote a high proportion of management effort to product development and marketing of a narrow product range. Vertical integration, on the other hand, enables managements to optimise costs and qualities throughout the overall process sequence, which may in many instances provide a more economic mode of operation than optimisation of each horizontal process. Integration of companies either horizontally or vertically tends to remove the proprietary element in management, and thus removes the strong personal motivation that characterises the industry at present. On the other hand, large organisations can usually offer much better career prospects for managers, and would thus tend to be much more successful in recruiting on a talent basis, and it was recommended forcibly in Article 16.7 that recruitment of skilled management from outside the industry is a vital step in the industry's development.

A further aspect of management is that of research and development. In some industries, such as aircraft and computers, this is the over-riding criterion for structure. Research in the wool textile industry is much less significant: in machinery and techniques, the research is already organised centrally in WIRA and the few large plant suppliers. However, product development cannot be undertaken this way, and every company ought to devote some effort to development of its current products and that of alternative products for which demand may grow in future. Whilst this can be done in small companies, the larger ones clearly have the advantage in terms of funds, management time available, and professional marketing and technical skills.

## 18.4 Finance and structure

Although the investments proposed in Chapter 17 are not large when viewed from the standpoint of the whole industry (£40 million compared with £441 million total assets) for individual companies they may well be substantial. For instance, total book value of assets of worsted weaving companies (from Table 5.1) stands at £13·5 million for 55 organisations (Table 4.2), giving an average of £250,000 total assets per organisation, yet a shed of only 50 pirnless looms will cost more than this. Thus there will be some small companies, unable to raise the finance for development, which will remain only marginally profitable at best, and which ultimately will be obliged either to be taken over or to close down, as described in Article 17.6.

Small companies are at a distinct disadvantage in the matter of raising new finance; their ability to do so may depend upon their willingness to dilute the equity holding or on their ability to persuade financial sources to permit gearing-up. Fixed-interest loans such as debentures are less attractive normally when issued by small companies than by large, and administration charges on new flotations can be prohibitive. Other disadvantages to small privately-owned companies are the need to cater for estate duties, and the close-company legislation. As indicated in Article 17.6, however, institutions such as the Industrial and Commercial Finance Corporation or the Estate Duties Investment Trust exist primarily to assist small private companies to develop; but even here the pressures are naturally towards growth.

From the finance point of view, therefore, there are strong pressures towards integration of small companies, but it matters little whether this be vertical or horizontal. However, integration may not be attractive to family businesses as the level of control is diluted, if not destroyed. The existence of particular financial structures, or of a large proportion of liquid assets, is a frequent incentive in take-over bids, and it is probable that several instances exist in the industry of companies that are especially suitable to be taken over simply to increase the capital-raising potential of the acquiring company.

## 18.5 Production and structure

The economics of scale diagrams in Part Three show, for each sector, the 'minimum size of defendable existing establishment'. At this size the operating cost, allowing no return whatever on the capital employed, is equal to the full comprehensive cost of operating a large establishment with new plant. Since the comprehensive cost includes proper capital charges and profit, this may be taken as the average selling price. At any sizes smaller than the minimum shown, therefore, sales become uncompetitive against the prevailing prices and the small company runs at a loss, other things being constant. Only specialisation to obtain price premia can enable such small establishments to exist for long. At the same time, investment in new plant capacity is not recommended below the size at which a proper return on capital can be obtained. As indicated earlier, this can require large amounts of new capital, whereas growth by integrating existing economic plant may be carried out in smaller stages.

Comparisons between present average production rates, minimum size of defendable existing establishment, and size of establishment for full economies of scale, are shown below for the major sectors in terms of lb per hour throughout.

| | *Present average output* | *Minimum viable* | *Full economies of scale* | *Significant economies of scale* |
|---|---|---|---|---|
| Combing | 750 | 800 | 1,600 | 1,600 |
| Worsted spinning: | | | | |
| Fine | 570 | 50 | 330 | 250 |
| Bulk | | 150 | 800 | 500 |
| Woollen yarn production: | | | | |
| Fine | 200 | 50 | 1,600 | 500 |
| Bulk | 330 | 100 | 1,600 | 600 |
| Carpet | 600 | 400 | 2,500 | 1,000 |
| Weaving (pirnless) | 400 | 200 | 800 | 600 |

Present average output is derived from the tables in Chapter 1, figures for 'minimum viable' and 'full economies' being taken from the relevant tables in Part Three. The 'full economies' figures are those above which size has no effect on costs, but significant economies of scale are achieved at lower rates than these. Rates of output giving significant economies are derived from inspection of Figures 9.6, 10.4, 11.5 and 12.5. It is apparent that even a modest degree of horizontal integration would be beneficial in combing, the smaller worsted spinners, woollen spinners, and in manufacturing. The cost pressures are not, however, large; to take one example, manufacturing at 300 lb per hour (instead of 600 lb per hour for significant economies of scale) only increases costs by about 8 per cent.

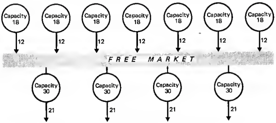
The effects of batch size on costs, as illustrated in Figures 9.7, 10.5, 11.6 and 12.3, are rather more important. Whilst determination of batch size is ultimately a marketing decision, significant production economies could be effected were it possible to aggregate orders into production batches to a greater extent than at present. Further horizontal integration would most easily enable this to take place and permit significant specialisation within establishments.

Vertical integration, of course, can also affect production costs. The savings in transport and stockholding are marginal, unless the product range is heavily rationalised at the time of integration. However, levels of plant utilisation can be increased, leading to significantly lower overall costs, during periods of over-capacity. Figure 18.1 shows as an example the situation when four similar downstream processors (such as weavers) are purchasing their materials from seven upstream processors (such as spinners). Since there is a free market, each upstream company in the limit will obtain sales pro rata to its capacity, thus maintaining comparable delivery speeds and service. In Figure 18.1(a) each upstream company is supplying 12 units from its capacity of 18, and is thus operating at 67 per cent utilisation.

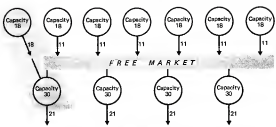
If now one upstream company integrates with a downstream company, the upstream company can be operated at much higher utilisation to the detriment of the non-merged upstream companies. This situation is illustrated in Figure 18.1(b), where the merged companies are shown in red. The downstream company uses the full capacity of the upstream, and buys its remaining requirements of materials on the free market. To be successful, the downstream company must be larger than the upstream.

## 18.6 Horizontal and vertical integration

The preceding four articles have indicated that there are considerable pressures towards integration in the industry; very strong marketing pressures, already making themselves felt even before specialisation and standardisation are common marketing policies, were shown to be inevitable concomitants of these proposals; pressures towards integration from



(a) Before the merger



(b) After the merger

FIGURE 18.1 – EFFECT OF VERTICAL INTEGRATION ON PRODUCTION

the aspect of achieving production economies tended to be weaker, but nevertheless point towards organisations larger than those generally in existence; while the need to raise finance almost inevitably causes immense difficulty within the small organisations and, indeed, in many of the larger ones in this industry, where the majority holding of even large public companies is sometimes jealously held by a few members of particular families.

The basic reasons why these pressures have not in the past been followed are twofold: the weakness of marketing, which has led to the neglect of economies of scale and the consequent fragmentation of production and control which in turn perpetuated the marketing deficiencies; and inbred and generally unimaginative management. It is hoped that the means to break out of the weak marketing circle have been clearly proved and will be immediately adopted, for it is vital for the industry's prosperity that they should be. The consequent release of pressures towards integration will find some management already fully capable of immediate response, and will provide a spur to the remainder.

It is recommended that, in the main, integration in the industry should take the form of horizontal integration between the small and medium-sized companies, the initiative obviously coming from those with the most dynamic management. It is felt that the multiplicity of smaller organisations in the industry is a bigger weakness—and its elimination will prove to yield the better results—than the need to enlarge the bigger organisations. The impetus for putting into effect the proposals of Chapter 15 in particular should, therefore, come primarily from the energetic management of certain of the medium-sized and small organisations in the sectors concerned. For the larger organisations, which should already have undertaken such marketing rationalisation if their integration has been at all meaningful, some degree of vertical integration for the purpose of obtaining 'base-load' security is proposed, but on the whole it is felt that excessive concern with verticality will detract from the importance of rationalisation and control of each horizontal process.

It is essential to realise, however, that these proposals, vital as they are, imply the proper co-ordination of management effort following integration, and also should follow, or at least accompany, the implementation of sound marketing policies rather than precede and replace them.

Finally, integration should occur largely only among companies committed to long-run output of bulk products. The marketing of specialities, often accompanied as it is by highly-motivated management and labour, is best continued in small companies. Indeed, even in the production of standard items, motivation is important, and if a small company can specialise profitably in one or two standard products, and its management has no wish to grow, then the loss of that management for the sake of a largely unnecessary integration would be to the detriment of the industry as a whole.

### 18.7 Acquisition of market outlets

In principle there is no difference between this and vertical integration within the industry; the strategic motive of acquisition in order to fill the productive capacity of the upstream process may also be relevant.

The customers of the industry are illustrated broadly in Figure 3.1. Blankets and hand knitting yarns are the only products which are not sold to intermediate industries, apart from small quantities of clothing accessories such as scarves and ties. Of some 50 hand knitting yarn spinners, about 15 have 86 per cent of the market. Altogether there are over 20,000 retail outlets, of which those owned by spinners account for nearly half the turnover. Most of the specialist hand knitting shops are owned by the large spinning companies, but they do not restrict their sales to their own products. The number of these specialist shops is falling, and new investment in such retail outlets is not recommended.

Blankets are generally sold either through mail-order firms or through retail stores. In either case, blankets are offered for sale with a wide range of other goods, and investment in specialist blanket shops cannot be recommended.

There are about 150 companies making carpets, and many of these are very small. About 70 per cent of the yarn required for woven carpets is already spun by integrated manufacturers, the remainder being supplied by about 30 to 40 spinners. Much of the success of these spinners lies in their skill in buying and blending wool from many sources. This sector of the industry is expanding and these spinning companies are not suffering undue pressure. However, their product is relatively standardised, and integration with carpet manufacturers appears to be a logical long-term development, although the manufacturers themselves may prefer to obtain a proportion of their needs from a competitive market. In the short term, growth to achieve economies of scale, perhaps by horizontal integration, is likely to be the most attractive alternative.

A large expansion of the industry's production of semi-worsted yarn is recommended. In Article 6.7 it was predicted that total UK consumption of semi-worsted yarns would increase from 39 m lb to 93 m lb a year, of which the carpet industry would continue to produce about 60 per cent. Economics of scale are very important in the tufted carpet trade, and it is estimated that eight firms now produce about 60 per cent of all tufted carpets. Orders for yarn are placed in very large batches; the yarns are very highly standardised, and there are attractive prospects for vertical integration. It is not expected that pressures will be felt to secure outlets during the next few years' rapid growth, but companies in the industry are advised to consider this possibility in their long-term planning. Some of the independent suppliers of semi-worsted yarns are outside the wool textile industry, and are likely to seize any opportunities that may be neglected by spinners in the industry.

It is estimated that about 100 companies of various sizes are engaged wholly or partly in spinning yarns for the hosiery industry, in which there are about 900 companies. The hosiery trade has grown very rapidly, and the increase in demand for yarns has provided the spinners with opportunities for growth without any need to secure their markets. The growth is expected to continue and, although sections of the trade dealing in fashion goods are obliged to provide a great variety, there are opportunities for specialisation and standardisation. It is recommended elsewhere that the industry should secure for itself a significant share of the new knitting capacity by installing its own knitting machinery; this option is open to the worsted spinning sector, amongst others. Many spinners already have marketing connections with buyers of knitted goods, and for reasons of long-term security of business it is recommended that spinners of suitable qualities of hosiery yarns should integrate downstream into knitting. This may be achieved either by installation of new plant, or by acquisition of existing concerns, or both.

In the production of women's clothing there is a large number of very small makers-up, and there are few operating on a substantial factory scale. Little capital is required for small-scale making-up, and, typically, makers-up are highly individualistic and ephemeral, many being dependent on the finance and goodwill of the cloth merchants who supply them. They need freedom to buy from a very wide range of materials to suit their designs and changing fashions. No changes are foreseen in the structure of the industry, in making-up of women's clothing or the fashion environment which are likely to cause integration downstream to be attractive.

In menswear the position is similar in that most clothiers expect to buy a wide range of cloth from a number of suppliers. But these clothiers buy much less through merchants, and exert considerable pressure on the prices and profits of weavers. There are now about 200 worsted manufacturers and a number of woollen manufacturers producing largely for the men's trade. The Census of Production for 1958 showed 459 makers of men's and boys' tailored outerwear, but the largest clothiers are big in relation to all except the biggest of their suppliers. As was pointed out in Article 18.5, incentives to integrate downstream can come from imbalance of capacity and demand. This situation exists now in some parts of the trade, and the need for variety is the main impediment to integration. In those parts of the trade where the products are highly standardised, such as trouserings, it is recommended that weavers should examine the opportunities for integration. A substantial part of the trousering trade has already been captured by companies outside the industry, and a serious situation could arise if those companies should pre-empt the market outlets.

Manufacturers of furnishing fabrics and of such specialised materials as pile fabrics for the toy trade are generally supplying relatively small components for their respective customers' products. Opportunities may occur for a few companies to diversify into these activities, but generally, downwards integration of this sort is not recommended.

### 18.8 The place of commission operators

Commission working is important at present in the activities of raw materials preparation, dyeing, mending and finishing. In the spinning sectors, many companies use commission-operating as a means of filling occasional spare capacity or meeting exceptional demand, but less than 5 per cent of all yarns are spun on commission. Commission weaving also accounts for less than 10 per cent of all manufacturing, although there are a few pure commission weavers. A number of small companies also carry out minor amounts of intermediate processes such as winding and warping on commission.

In general, apart from the value of commission-working as a means of balancing capacity and demand across the industry, it is also advantageous to the industry where specialised plant or skills are required, and these can be operated more economically and efficiently in establishments which do nothing else. The concentration of their resources and ability to sell their services widely enables pure commission processors to achieve better plant and labour utilisation than can normally be attained in integrated establishments, where plant is never perfectly balanced. Motivation for efficiency, quality and service are typically better in independent establishments than in integral units, and these factors frequently combine to provide the most economical arrangement for the industry. There is also a need for commission working where a service is required for which the economics of scale are such that only the largest companies could have their own plant. Computers are an example of this, and package yarn dyeing plant is probably another. The important commission operations are considered separately below.

*Raw material processing*

In the handling and preparation of new fibres and wastes there are a number of small concerns which carry out specialised jobs on commission. These include willeying, garnetting, fearnoughting, de-seeding, blending, scouring and bleaching. Although some concentration is to be expected among fibre users and most large organisations have their own handling and processing capacity, it is expected that there will be a continuing need for commission establishments in this part of the industry for many years. Some of these processes, such as scouring, are becoming relatively capital-intensive, and some growth and concentration of such establishments will be necessary.

*Weaving*

Commission weavers generally get their business from manufacturers without looms or from customers of the industry, although part of their production is for other manufacturers. The only essential saving in commission weaving of copied designs is the cost of designing. The questionnaire showed that, for about 20 per cent of manufacturers, design and sample-making cost 5 per cent of turnover or more; the average is estimated to be about 2·5 per cent. Almost all manufacturers who do their own designing also do a fair amount of copying and manufacturing to the designs of their customers. Some rationalisation of designing is recommended elsewhere, and a number of weavers could reduce their design costs without adverse effects; this will tend to reduce the inherent cost advantage of the commission operator. However, in view of the considerable proportion of manufacturing of standard patterns and customers' designs, commission weaving has a logical place in the industry. It is also apparent that some of these establishments are very well managed. Having to provide prompt and efficient service, they attach great importance to plant utilisation and production control, and their added value, including profit margins, is competitive. However, if a large part of the industry were to abandon the design function, the industry as a whole would be in danger of losing its unique place in the international market, and it is recommended that the proportion of commission weaving should not be increased substantially.

*Burling and mending*

About 20 per cent of cloth is burled and mended on commission. This is an exceptionally labour-intensive group of processes calling for considerable manual skill. The proper performance of this function determines to an important extent the quality of the final product. There is evidence that standards of quality are not always maintained, and one of the principal causes for complaint is poor mending. Recommendations are made elsewhere concerning the improvement of cloth quality by provision of better yarn qualities in larger packages, but apart from this, the prime responsibility for quality clearly rests with the manufacturers. Weavers who choose to have burling and mending done on commission should carry out the same inspection and quality control as if the work had been carried out in their own establishments. Generally, however, it is considered that this is a function which should be integrated with manufacturing.

*Finishing*

About 30 per cent of all the industry's cloth is finished on commission. Woollen finishing plant is relatively simple and flexible to operate, and the finish of woollen goods is an essential part of their design. Most fancy woollen manufacturers therefore do their own finishing, and only about 17 per cent of woollen cloth is finished on commission. Worsted cloth requires a larger number of special finishing operations requiring different plant, and any single worsted manufacturer is unlikely to achieve such consistency of production as to keep all his finishing plant and labour properly utilised without causing delays. About 52 per cent of worsted cloth is therefore finished by specialist commission finishers. Table 1.6 shows that commission finishers work significantly more hours per week than the integrated finishing departments of mills. Output in pieces per hour is, on average, more than 50 per cent higher. Therefore it is recommended that, except where there are strong reasons for integration, as in the fancy woollen sector, finishing should continue to be done in specialist commission establishments.

The British industry has a competitive advantage in the international market owing to its unequalled expertise in the finishing processes. This is an area in which traditional skills are being improved by active research and development work—a situation which is likely to favour the larger establishments. A moderate amount of concentration in this sector could prove to be beneficial to the industry as a whole, if it facilitates technological development.

*Dyeing*

There are approximately equal numbers of commission dyers and spinning or weaving establishments with their own integral dyeing facilities. However, some integrated establishments habitually dye only part of their own production. Many of the commission dyers specialise in one or more of the categories of dyeing shown in Table 13.1, and many also specialise in other processes such as bleaching, shrink-resisting, melange-printing and finishing processes; or in special categories of fibre. Most top dyeing is done on commission, while the majority of loose-stock dyeing for the woollen system is done in integrated establishments. Yarn and piece dyeing are divided fairly equally between the two types.

The questionnaire returns show that the allocation of labour to machines is almost identical in the two types of dyehouse, commission and integrated dyehouses, but it is found that a much greater proportion of modern high-temperature plant has been installed in integral units. Nevertheless, commission dyers and finishers have been the most profitable sector of the industry in recent years.

The quantities of materials to be dyed at different stages in the mid-1970's are shown in Table 13.1, and the minimum sizes of each type of dyehouse in terms of the output at which reasonable economies of scale can be achieved, are given in Table 13.3. From these two tables the maximum theoretical number of dyehouses in the mid-1970's can be deduced assuming all are at the prescribed minimum size. Assuming proportions of integrated and commission dyers approximately as at present, the following hypothetical numbers are derived:

| *Type of dyeing* | *Total number of dyehouses* | *Integrated dyehouses* | *Commission dyers* |
|---|---|---|---|
| Loose stock | 117 | 87 | 30 |
| Top | 54 | 11 | 43 |
| Hank yarn | 71 | 36 | 35 |
| Package yarn | 46 | 23 | 23 |
| Piece | 112 | 56 | 56 |
| | 400 | 213 | 187 |

Since a proportion of these establishments can be expected to be substantially larger than the sizes shown in Table 13.3, the numbers should be fewer in both categories than those shown above. The resulting numbers are sufficiently similar to the numbers now existing to indicate that no major change need take place in the total number of dyeing establishments. In any case, economic operation depends more on efficient plant loading than on the size of establishments.

The most important change proposed in Chapter 13 is a substantial increase in package yarn dyeing capacity. It has been suggested that plant of this sort can only be operated efficiently in integrated establishments, where production planning for the entire mill can be properly co-ordinated. However, it is a feature of commission working that, in general, plant loading is better than in integrated mills. Furthermore, package dyeing is recommended largely for marketing reasons, and the proposed marketing advantages can only be made available to all spinners and manufacturers in the industry if a considerable proportion of package yarn dyeing is done on commission. Since the companies which are expected to benefit most from package dyeing are the hosiery yarn spinners and worsted manufacturers, and these are largely non-integrated, it would be most beneficial if at least half of the new package dyeing plant were to be installed by commission dyers.

It is not recommended that there should be any significant change in the proportions of the industry's materials dyed by commission dyers or in their total number. However, it is recommended that any which are now below the economic size should consider growing or integrating horizontally, and that attention should be paid to modernisation.

### 18.9 The place of the merchants

The merchants considered in this article are the wool merchants who buy at auctions and sell to the industry, and noil, waste, and re-used fibre merchants. The wool-merchanting function prior to auction is not part of this study; cloth merchanting is considered in Article 15.5.

There is a considerable number of wool merchants, and many of them have formal or informal association with offices in the countries of origin. In present trading conditions they provide a useful service, acting as stockholders to even out fluctuations in demand, and carrying out all the buying, handling, shipping, storage and distribution for many small buyers who could not readily carry out these functions themselves. Merchants typically provide large amounts of working capital and the competition is such that profit margins are usually small. As topmakers become concentrated into relatively few large buying organisations, it is likely that a smaller proportion of merino wool will be handled by merchants, and it is probable that direct buying is the most economical procedure where the buyer is sufficiently large. However, concentration to a similar extent is not expected in the woollen sectors, and wool merchants will continue to provide an economic and valuable service to the industry.

The number of noil and waste merchants in the industry is estimated to be about 90. Almost all are private firms with fewer than 10 employees, but a number of larger organisations, concerned mainly with rag and waste processing, also undertake noil and waste merchanting from time to time. Most of the merchanted wastes emanate from the worsted system, as the majority of usable woollen wastes are returned directly into the processes in the same organisation.

Noils and wastes currently represent about 12 per cent of the raw materials used in the woollen system. This trade is therefore important as a source of raw materials, and as an import substitute; exports are also significant, and most of this business is done by merchants.

Noils are often sold by combers by auction, but combers and spinners generally prefer to contract for the removal of all wastes accumulated over a period of time by a single merchant.

The merchants' functions include collection from a number of sources, sorting, and blending into batches to suit the requirements of a large number of customers. They may also have to arrange for processing of wastes. These operations of bulking-up, sorting, stocking, breaking into small lots and distribution are essentially merchanting functions, and it is not recommended that production companies should attempt them. Merchanting will continue to occupy an inconspicuous but valuable place at the raw materials end of the industry.

Although the trade in mungo and shoddy involves a considerable amount of processing, it is similar to waste merchanting in many ways and, for convenience, is considered here. To an increasing extent the Morley industry, producing cheap woollen fabrics such as blazerings and duffel-coatings, is becoming self-sufficient in supplies of pulled rags, due to concentration in the hands of a few fully integrated companies. A few fancy woollen manufacturers are also known to be integrated upstream into rag processing. Nevertheless, questionnaire returns show the existence of about forty companies solely or primarily concerned with rag-pulling and/or waste-pulling. Figure 1.3 shows that at present 56 million lb of rags enter the industry, i.e. 20 per cent of the total input to the woollen system. In addition, annual exports of mungo and shoddy have been in the region of 10 million lb.

This trade depends on the purchase of rags either at auction or from 'marine stores'. Some rag processors have their own marine stores. Rags are sorted, graded and cleaned and, typically, large quantities are held in stock so that batches can be pulled to customers' orders in about 7 to 14 days. Standard qualities may be pulled in advance so as to provide deliveries ex-stock.

This sector is experiencing great difficulties, largely due to the increasing use of wool and man-made fibre blends from which the constituent fibres cannot readily be separated. The number of companies in the sector is decreasing and this trend is likely to continue, but the re-used fibre trade is important to the industry and it is recommended that resources should be allocated to WIRA with a view to overcoming the technological problems. Further concentration to increase the commercial and economic strength of the remaining companies is also recommended.

### 18.10 Future structure of the industry

The earlier articles of this chapter have considered different types of structural change and the way in which each major part of the industry should respond to economic and environmental pressures. Many establishments can achieve significant increases in production, in the same buildings and with the same plant capacity as at present, by means of multi-shift operation and, where appropriate, it is recommended that this should be done. This will result in the forecast output being produced in a smaller number of establishments, and it is foreseen that a number of establishments should be closed for this reason. In some cases, attractive opportunities will occur for securing marketing, management and financial strength, and better economies of scale, by means of horizontal integration. When such a size bas been attained that further horizontal growth will yield small additional benefits, vertical integration may prove equally attractive. However, it is considered vitally important that the industry should retain its character as a producer of high quality and great variety. It has been found elsewhere that the concentration of wool textiles into a few highly-integrated organisations results in drastic reductions in the product range, and it is vital that this trend should not go too far.

The management in this industry is conditioned to a highly-fragmented structure, and a substantial amount of training and adaptation will be needed to fit it for the recommended changes in shift systems, new plant and larger outputs from establishments. Integration of companies will undoubtedly occur where talent or finance require increased scope of operation, but mergers cannot be successful when management talent is lacking. Too often companies fail to gain the apparent advantages of integration due to inability of their managements at all levels to maintain communications and operate the more complex systems required in larger organisations.

It is possible that very rapid concentration of the industry could occur if the few very large companies should start a race amongst themselves. This is most likely to occur if one of the man-made fibre manufacturers should attempt to secure his outlets by acquiring a large proportion of the industry. This could initiate a competitive landslide of acquisitions, and the structure and character of the industry could be changed very rapidly; this would not be in the best interests of the industry.

In Table 18.1 some of the consequences of the recommendations in the report are assessed. The first column in the table shows the approximate number of establishments in which each of the named activities is carried out at present. The middle columns show present and future recommended average sizes of establishments and the currently available and required future capacities. Figures for average output of integrated mills cannot be given, as they perform a range of activities and produce a range of products. The currently available and required future capacities are based on the proposed outputs shown in Table 8.2, taking into account the 15 per cent of reserve capacity and recommended changes in hours per week to be worked as described in Chapters 9 to 13. The last column of Table 18.1 shows the estimated number of establishments in which these activities will be carried out in the mid-1970's. The number of mills shown in this column for the single activities are clearly not derived directly from the figures in the previous columns; allowance has had to be made for the fact that the integrated mills also carry out these processes.

Economics of scale depend largely on capacity in lb per hour, i.e. plant capacity, and the option of reducing the sizes of all establishments in proportion to the excess capacity is therefore not advisable, even if it were practicable. Therefore, establishments should be taken out of production. Table 18.1 suggests that the reduction should be about a third of the total, representing an annual rate of closure of about 5 per cent. Discussion with representatives of the industry has confirmed that many organisations with more than one establishment could benefit by internal rationalisation and closure of establishments. Some single-establishment organisations should also close. The rate of closure recommended above is comparable with the recent record given in Article 4.1.

In considering companies, as opposed to establishments, two opposing trends are likely. Firstly, many of the organisations with more than three establishments will close one or more of their establishments whilst keeping the organisations intact. Secondly, a significant number of single-establishment organisations should cease business or be absorbed by integration with others. It is therefore difficult to predict the changes in numbers of organisations and the figures proposed in Table 18.2 are intended to be illustrative rather than a precise forecast of future events. However, it is estimated that the total number of organisations may be expected to fall more quickly than the number of establishments, at about 6 per cent per year, to about 600 by the mid-1970's.

### 18.11 Future of the central services and associations

The present central organisation of the industry and the important connections between them and outside bodies are depicted in Figure 4.2. In most respects the arrangement works extremely well, and much credit is due to those companies which allow their senior staff to devote their time to the industry's affairs. Indeed, the most serious criticism encountered in this study concerned the heavy demands made on top management and the difficulty experienced in obtaining replacements for office bearers. Whereas many of the recommendations elsewhere in this report are thought to be essential to the future prosperity of the industry, recommendations are put forward in this article more with a view to streamlining an already-viable structure. Also, whereas most other recommendations

**Table 18.1 – Establishments in the mid-1970's**

| Division | *At present* Number of mills | *At present* Average output per mill (m lb per year) | *Capacity (m lb per year)* Available at recommended hours | *Capacity (m lb per year)* Required including reserve | *In the mid-1970's* Average output per mill (m lb per year) | *In the mid-1970's* Number of mills |
|---|---|---|---|---|---|---|
| Combing and recombing | 50 | 4·0 | 400 | 320 | 6·0 | 30 |
| Worsted spinning | 140 | 1·0 | 320 | 250 | 1·6 | 90 |
| Woollen yarn production | 70 | 0·87 | 420 | 250 | 1·4 | 40 |
| Semi-worsted yarn production | 10 | 1·5 | 34 | 40 | 3·7 | 10 |
| Worsted weaving | 120 | 0·45 | 94 | 90 | 0·7 | 60 |
| Woollen weaving | 70 | 0·51 | 220 | 140 | 0·7 | 40 |
| Knitting | – | – | – | 28 | 1·2 | 20 |
| Integrated worsted | 50 | – | – | – | – | 40 |
| Integrated woollen | 170 | – | – | – | – | 120 |
| Woollen and worsted | 70 | – | – | – | – | 50 |
| Dyeing and finishing | 120 | 1·6 | 660 | 480 | 2·5 | 70 |
| Other | 600 | – | – | – | – | 380 |
| TOTAL | 1,470 | – | – | – | – | 950 |

Table 18.2 – Companies in the mid-1970's

| Division | Number at present | | Number in mid-1970's | |
|---|---|---|---|---|
| | *Organisations* | *Establishments* | *Establishments* | *Organisations* |
| Combing and recombing | 20 | 50 | 30 | 15 |
| Worsted spinning | 65 | 140 | 90 | 35 |
| Woollen yarn production | 35 | 70 | 40 | 20 |
| Semi-worsted yarn production | | 10 | 10 | |
| Worsted weaving | 60 | 120 | 60 | 25 |
| Woollen weaving | 35 | 70 | 40 | 20 |
| Knitting | – | – | 20 | – |
| Integrated worsted | 30 | 50 | 40 | 25 |
| Integrated woollen | 130 | 170 | 120 | 80 |
| Woollen and worsted | 60 | 70 | 50 | 40 |
| Dyeing and finishing | 100 | 120 | 70 | 60 |
| Others | 465 | 600 | 380 | 280 |
| TOTAL | 1,000 | 1,470 | 950 | 600 |

are for evaluation and implementation by individual managements to suit their particular circumstances, the following are offered for collective consideration by the representative bodies.

Apart from the major problem of excessive demands on individuals there are a few other facts which call for examination. Firstly, it is notable that the Employers' Council carries out central negotiations on wage rates, conditions of employment, etc. only for the Yorkshire section of the industry. Decentralised negotiation and settlement of disputes is to be encouraged but, where central negotiation and representation is appropriate, it is considered that the central bodies should be fully representative of the whole industry. In due course more extensive co-operation between textile industries may call for further change, but at this stage it is thought advisable that the employers' organisation and the NAUTT should represent all the federations and unions concerned with the wool textile industry.

Secondly, it has been suggested that there are too many federations and unions and that they could secure office bearers more easily and represent their members more effectively if they were fewer. This is strictly a matter for the members themselves to decide and no firm recommendations can be made. However, it is probable that further concentration and integration will blur the boundaries between process-orientated federations and unions and, within the next decade, some amalgamation of representative bodies will occur naturally. When this happens the resources available should enable additional services to be provided. As an example of such services the useful and well-patronised annual conference of the Worsted Spinners' Federation Ltd may be quoted. The industry is advised to examine its representative structure from time to time to ensure that it continues to meet the members' needs in the changing circumstances.

There is also the possibility of complete amalgamation of the central organisations with those of other textile industries. The boundaries between these industries are already becoming less distinct and it is likely that this trend will eventually cause such amalgamations to occur naturally and to the benefit of all. However, the wool textile industry is facing a period of internal re-organisation and change and all its resources should be concentrated on its own affairs for the next few years. Co-ordination of commercial and research interests is already achieved through the Derby Group and the Nottingham Committee respectively, and it is by fostering and developing such informal consortia that the eventual unification is likely to occur most happily.

With these considerations in view a simplified structure is proposed in Figure 18.2. A single central body is suggested, representing all the federations in the industry, responsible for all the functions of the Employers' Council and the Delegation, and also co-ordination within the industry's own organisations and with outside bodies. Its functions could be assigned to expert sub-committees, or co-ordination could be achieved by nominating representative members to such controlling committees as the WIRA Council and, provided the DEP concurs, to the Training Board.

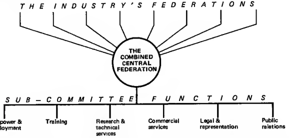


FIGURE 18.2 – SUGGESTED STRUCTURE OF THE CENTRAL ORGANISATIONS

However, present arrangements have worked so well for many years that it would be foolish to prejudice future relations without good cause. Nevertheless, the Trades Unions themselves are reviewing their own structure, and there is no reason why the employers should not do likewise. At all costs the appalling warfare in industrial relations in other industries must be avoided; both management and Unions have the opportunity to set an outstanding example to the outside world by maintaining the present excellent relations through a period of rapid change.

# Appendices

# Acknowledgements to the Association of Wholesale Woollen Merchants

Although cloth merchants were not included within the scope of the study, they clearly play a vital part in distributing the products of the wool textile industry, both at home and in the export markets. The consultants therefore sought advice from the Association of Wholesale Woollen Merchants, who generously co-operated, giving information and meeting the consultants for discussions on four occasions. As there was no opportunity for detailed discussions with member firms, we give here the Association's views on drafts of the relevant sections of the report.

"1 The Association of Wholesale Woollen Merchants represents the interests of British woollen merchants, through whom about a quarter of the industry's cloth output is marketed.

"2 The Association deplored the denial to woollen merchants of representation on the EDC's steering committee of the marketing study. Despite this, the Association agreed to co-operate fully with the consultants, providing all possible information and assistance, on the understanding that the relevant parts of the report should be made available to them for comment. That arrangement has been observed.

"3 The Association recognises the value of an independent report by consultants on the industry. It is, therefore, reluctant to request the consultants to record the Association's comments on these relevant aspects of the draft report. It has decided to do so for two main reasons:

(a) The Association feels that the draft report insufficiently appraises its members' present performance and thus scales down their potential role in the future marketing structure.

(b) Any failure to understand here or abroad the function of British woollen merchants could have far-reaching detrimental effects on the industry.

"4 From the advance extracts the Association has seen, the report gives insufficient consideration to the constantly growing fashion influence on the worsted industry for the men's trade and the dominant fashion influence on the women's trade. Merchants are in a more favourable position than manufacturers to know of fashion trends because of their world-wide contacts with the fashion leaders, who are more often the small accounts and not bulk users. These contacts enable merchants to pool ideas, generate new concepts in colour, design and cloth construction and thus stimulate manufacturers.

"5 The report recommends that production be rationalised by specialisation and standardisation. While the Association believes that this would be largely beneficial, it regards as risk-increasing the recommendation relating to production for stock. Woollen merchants can speak with long experience of those constant fashion changes and seasonal influences which the report ignores in this context. Even cloths regarded as standard may suddenly diminish in saleability. Unsold stock inflates financing costs and undermines the competitive position of the seller in the world markets.

"6 The report argues a need for individual companies within the industry to intensify product specialisation. While standardisation and specialisation are to be commended, the Association is surprised that the consultants put forward the concept of a quasi-merchanting organisation formed by the industry without investigating the expenses of running such an organisation in comparison with current merchanting costs. If a producer is dealing with a relatively small number of large users, no elaborate or expensive sales organisation is required. Where, however, a producer wishes to deal with a wide variety of customers and offer to them the limited number of specialised products in small and large quantities, an elaborate selling organisation is required, comprising credit control, pattern servicing, shipping, invoicing, accounts etc. The overhead costs of such an organisation would in turn discourage the bulk user from buying from this source. Such a hybrid organisation is unlikely to prove to be the most profitable to a manufacturer.

"7 The Association considers that the right marketing strategy for a manufacturer is to concentrate on users who take bulk and that this category would include the merchants, and that manufacturers should stipulate a minimum order size and establish realistic differentials for quantities. The result would be that they would themselves serve the largest users in the industry and would cover the remainder, at low cost, through the merchants. These latter, confident that the manufacturer is adopting a rational marketing plan in which the merchant has a definite place, would themselves be certain of their market. The Association favours a very much closer co-operation between the manufacturers and merchants without necessarily involving financial integration and it agrees with the consultants' report on many recommendations such as establishment of quality control and standards.

"8 Advertising: The Association considers that the suggestion of the consultants to establish brands of goods by area image would be very difficult to carry out. Whilst this has been possible in the wine trade where wines are produced in certain districts, it would be very difficult to establish why goods, however excellent, made in a certain area should be better than those made in another area. It is felt that more could be achieved in the advertising field if manufacturers, merchants and other organisations, such as the National Wool Textile Export Corporation and the National Association of Scottish Woollen Manufacturers, pooled their resources in an advertising campaign on a very much larger scale than present fragmented advertising efforts.

"9 If the draft report's cloth marketing recommendations were fully accepted, the merchants, who are one of the industry's most stable outlets, would be weakened to the detriment of the industry as a whole. It has always been recognised that, for an industry to be successful in its exporting it must have a stable home market. The upsetting of the present home market might weaken considerably the existing marketing channels with disastrous consequences to the export trade. Furthermore, the draft report fails to assess the extent of purchases from the industry by overseas merchants, who are often linked in various ways with British merchants. These merchants are often most substantial export customers of manufacturers. If the recommended cloth marketing organisation were adopted, these foreign merchants would be alienated, to the great detriment of the industry.

"10 The sale of British fabrics abroad is greatly aided by their prestige appeal and the image of quality. Both these factors are created and maintained by marketing to high-class tailors, to the couture and to fashion stores by the merchants. A weakening of this sector would have an effect similar to that which the disappearance of the French couture would have on the French textile industry.

"11 The Association submits these observations in a constructive spirit and in the hope that they may lead to an improved understanding of merchants by manufacturers.

"ASSOCIATION OF LONDON WOOLLEN MERCHANTS

"London,
April, 1969"

# Membership of the Marketing Study Steering Group

*Chairman*—Mr W P Bulmer

Mr E Atherton
Mr G C Barber
Mr E Barlow
Dr P W Carlene
Mr J G D Chapple
Mr J A Clough
Mr P N Davies
Mr H Dobson
Mr W Downs
Mr G H Dyson
Mr J A Evans
Mr R P Fawcett
Mr D Finlay-Maxwell
Mr D J Goodenday
Mr A G M Hall
Mr C Hall
Mr H J H C Hildreth
Mr J C Ingram
Mr C N Jupp
Mr D Kirkbright
Mr J McKelvie
Mr F B Murgatroyd
Mr P G Naylor
Mr N Newton
Mr R O'Brien
Mr J A Peel
Mr B I Pilley
Mr D G Price
Mr J S Priestley
Mr W H Smith
Mr B J Spencer
Mr K T Thomson
Mr R S Viney
Mr G D Wade
Mr N H Weir

*Secretary*—Mr B Hill

**Members of the Steering Group's Executive Committee**

*Chairman*—Mr W P Bulmer

Dr P W Carlene
Mr J G D Chapple
Mr J A Clough
Mr G H Dyson
Mr J A Evans
Mr R P Fawcett
Mr D Finlay-Maxwell
Mr H J H C Hildreth
Mr C N Jupp
Mr P G Naylor
Mr J A Peel
Mr D G Price
Mr B J Spencer
Mr K T Thomson
Mr R S Viney

*Secretary*—Mr B Hill

# Membership of the Advisory Panels

**Chairmen of Phase 1 panels**

| | | |
|---|---|---|
| Home markets, and marketing methods outside the industry | *Chairman–* | Mr R S Viney |
| | *Vice-chairman–* | Mr G H Dyson |
| Marketing within the industry | *Chairman–* | Mr A G M Hall |
| Export markets and marketing | *Chairman–* | Mr D G Price |
| Raw materials supply and purchasing | *Chairman–* | Mr D M Knight |
| | *Vice-chairman–* | Mr D C Ackroyd |
| Raw materials processing | *Chairman–* | Mr F Heppenstall |
| Worsted and woollen spinning | *Chairman–* | Mr J A Clough |
| Fabric manufacture | *Chairman–* | Mr B J Spencer |
| Dyeing and finishing | *Chairman–* | Mr J A Evans |
| Materials handling, packing and transport | *Chairman–* | Mr D Finlay-Maxwell |
| Finance and taxation | *Chairman–* | Mr T W Hibbert |
| | *Vice-chairman–* | Mr J Sweeting |
| Management structure and techniques | *Chairman–* | Mr K T Thomson |
| Manpower and training | *Chairman–* | Mr J A Peel |
| | *Vice-chairman–* | Mr G C Barber |
| Related industries | *Chairman–* | Dr P W Carlene |
| Structure of the industry | *Chairman–* | Mr W P Bulmer |
| Analytical method | *Chairman–* | Mr W P Bulmer |

**Chairmen of Phase 2 panels**

| | | |
|---|---|---|
| Production and capacity | *Chairman–* | Mr B J Spencer |
| International cost competitiveness | *Chairman–* | Dr P W Carlene |
| Forecast of United Kingdom consumption | *Chairman–* | Mr G H Dyson |
| | *Vice-chairman–* | Mr R S Viney |

**Chairmen of Phase 3 panels**

| | | |
|---|---|---|
| Processes and plant | *Chairman–* | Mr B J Spencer |
| Marketing in the United Kingdom | *Chairman–* | Mr J G D Chapple |
| Marketing overseas | *Chairman–* | Mr D G Price |
| Structure of the industry | *Chairman–* | Mr W P Bulmer |
| Manpower, management and controls | *Chairman–* | Mr R O'Brien |
| | *Vice-chairman–* | Mr D Finlay-Maxwell |
| Response to variation and change | *Chairman–* | Mr J A Clough |

Members of the advisory panels

Mr D C Ackroyd
Mr H Ballantyne
Mr E Barlow
Mr R Barlow
Mr W Barnes
Mr W Barnish
Mr A D Bateman
Mr G S Bates
Mr P Bell
Mr A Below
Mr D L D Blackburn
Mr J H Blackburn
Mr M Bonney
Mr H L Bos
Mr H C Brown
Dr C S Bruce
Mr B Butterworth
Mr M Carr
Mr M P Clay
Mr W C Coleman
Mr I F Cordial
Mr M Cronin
Mr J G Crowther
Mr W A R Crowther
Mr K G Dallas
Mr W J Dawson
Mr J A Dean
Mr H Dobson
Mr W Downs
Mr C Dracup
Mr M Dracup
Mr F W Etchells
Mr B J Exley
Mr T R Fairgrieve
Mr R P Fawcett
Mr J B Fox
Mr M P Fox
Mr L A Gill
Mr T Gillson
Mr E Glendinning
Mr A Goldie
Mr D J Goodenday
Mr D K Haigh
Mr J Haigh
Mr C Hall
Mr D Hanson
Mr J A D Harrison
Mr A L Henderson
Mr D P H Hield
Mr A Hirst
Mr B Hirst
Mr J Hobbs
Mr J D Hood
Mr J G Hopkinson
Mr J M Horsfall
Mr J Humble
Mr G Hustler
Mr J C Ingram
Mr N James
Mr A H Jerome
Mr R H Jones
Mr J Kean
Mr J C Kilner
Mr E Kirk
Mr D Kirkbright
Mr C F Lawton
Mr J Lawton
Mr H Leach
Mr D Lees
Mr P W Levell
Mr M Mahoney
Mr J Massam
Mr P Michelson
Mr A Mirsky
Mr J Morrod
Mr R L Munro
Mr F B Murgatroyd
Mr P L Musgrave
Mr G D Myers
Mr F C Naylor
Mr G Newberry
Mr D G Newton
Mr N Newton
Mr B S Nickell-Lean
Mr H E Oates
Mr P H Oates
Mr G C Overton
Mr C E S Page
Mr B Parkinson
Mr G Phillips
Mr B I Pilley
Mr F C Pratt
Mr J S Priestley
Mr P J Raspin
Mr J G Raybould
Mr J G Reid
Mr P Rhodes
Mr G Richardson
Mr C M D Roberts
Mr R W P Sanderson
Mr D W M Scott
Mr M W Scott
Mr J Sharp
Mr A Shaw
Mr J Cameron-Shaw Snr
Mr R S Shelton
Mr G D Shires
Mr R S Skinner
Mr T J H Smeeth
Mr A Smith
Mr C R Smith
Mr J D Spooner
Mr R V Stroud
Mr P Summer
Mr B R Sutcliffe
Mr J Sweeting
Mr J A Sykes
Mr J S Taylor
Mr P J Taylor
Mr D Hunter Thorburn
Mr M W H Townsend
Mr Benson Turner
Mr C D L Verity
Mr P Ward
Mr L Warnett
Mr N H Weir
Mr D Wilkinson
Mr A J Wilson
Mr E H Wolfe
Mr G A Wray
Mr M Zilleson

UNIVERSITY * CAMB 12 1969

| EDC membership | |
|---|---|
| *Chairman* | |
| W H Mosley Isle CBE | Retired partner, Peat, Marwick, Mitchell & Co |
| *Members* | |
| W P Bulmer | Managing director, Bulmer & Lumb Ltd; chairman of the EDC's marketing study steering group |
| J A Clough | Managing director, Robert Clough (Keighley) Holdings Ltd; vice-chairman, Wool Textile Delegation |
| P N Davies | Department of Economic Affairs |
| Michael P Fox | Chairman and joint managing director, Fox Bros & Co Ltd; chairman, West of England Wool Textile Employers' Association |
| C Hall | Member of the executive council, National Association of Unions in the Textile Trade |
| C N Jupp CMG | Board of Trade |
| D Kirkbright | Member of the executive council, National Association of Unions in the Textile Trade |
| D M Knight | Director, Sir James Hill & Sons Ltd |
| C Liversidge | Managing director, James Watkinson & Sons Ltd; chairman, Wool (and Allied) Textile Employers' Council |
| F B Murgatroyd | Managing director, Henry Lister & Sons Ltd; member of executive committee, Wool (and Allied) Textile Employers' Council |
| P G Naylor | National Economic Development Office |
| N Newton | President, National Association of Unions in the Textile Trade |
| J A Peel | Secretary, National Association of Unions in the Textile Trade |
| D G Price OBE | Director, Export Group, National Wool Textile Executive; secretary-general, International Wool Textile Organisation |
| D W M Scott | Chairman and managing director, Scott (Dudley Hill) Ltd |
| Sir Roger Stevens GCMG | Vice-chancellor, Leeds University; chairman of the Yorkshire and Humberside Economic Planning Council |
| D Hunter Thorburn | Managing director, Walter Thorburn & Bros Ltd |
| *Secretary* | |
| K A Munro | National Economic Development Office |

Printed in England for Her Majesty's Stationery Office by Westerham Press, Limited, Westerham, Kent.
Typesetting and illustrations by Woodcote Press Limited, Epsom, Surrey

Dd 154004 K40 6/69

NATIONAL ECONOMIC DEVELOPMENT OFFICE

# THE STRATEGIC FUTURE OF THE WOOL TEXTILE INDUSTRY

A report prepared by W S Atkins & Partners for the Marketing Study Steering Group of the Economic Development Committee for the Wool Textile Industry

12 AU 1969

LONDON
HER MAJESTY'S STATIONERY OFFICE 1969

*The Economic Development Committees are composed of representatives of the three parties involved in industrial and economic development–management, trade unions and government. Their secretariat is provided by the National Economic Development Office, which is an independent, publicly financed body. This report has been prepared by W S Atkins & Partners on behalf of the Marketing Study Steering Group of the Economic Development Committee for the Wool Textile Industry. For administrative convenience the report is printed and published through HMSO.*

National Economic Development Office
Millbank Tower, 21/41 Millbank
London swl
01-834 3811
June 1969

SBN 11 700390 5*

# Foreword

The Strategic Study of the Wool Textile Industry carried out by W S Atkins & Partners on behalf of the Wool Textile Economic Development Committee is a unique venture and an outstanding example of what can be achieved by an EDC which brings management, unions and government into close co-operation to tackle the fundamental problems of industry. It is the most detailed and comprehensive study of a complete industry so far carried out on behalf of an EDC and involved many members of the industry as individuals, as members of advisory panels and as members of the Steering Group and its Executive Committee. In addition to this high degree of industry participation a significant proportion of the cost of the study was paid for by the industry.

This combined approach by both sides of industry and government represents a new and workmanlike way of getting to grips with the basic problems facing industry today caused by changing conditions and the pressure of increasing international competition. The Wool Textile Industry is to be warmly congratulated on its initiative, foresight and enterprise in undertaking this pioneering work.

The study has been extremely thorough and represents a dispassionate assessment of the industry, its environment and its strategic future. But more than that, it is stimulating and constructive. It points the way to the future for the industry. Consideration and implementation of the recommendations will no doubt exercise the attention of individual firms and the industry's organisations for some time ahead. I commend the report to the industry and all those interested in its future prosperity.

Finally, no foreword to this report would be complete without acknowledgment of the unstinting efforts of Mr W P Bulmer the Chairman of the Steering Group and Executive Committee which guided the course of this study. To his enthusiasm and wise handling the success of this ambitious project is very largely due.

**H F R Catherwood**
**Director General**
**National Economic Development Office**

# Preface

The Wool Textile EDC having decided to form a Steering Group to conduct a broad study of the industry, there followed a comprehensive programme of consultations throughout the industry regarding the scope of the study, the involvement of the industry, and the question of financial support. These consultations laid the foundations for the wonderful degree of industry participation and involvement which has been an outstanding feature of the study.

Over a quarter of the cost of the study was met by financial contributions from federations and non-federated firms in the industry and from suppliers of the industry's raw materials, the remainder being met by the Government through the National Economic Development Office. An inestimable contribution was also made by over 150 members of the industry who gave freely of their time to serve as members of the Steering Group and of the advisory panels which were formed to assist the consultants. The study and those who participated undoubtedly benefited from this cross fertilisation of ideas. On behalf of the EDC I warmly thank them all for their very valuable contribution.

I believe that the report merits the earnest consideration of everyone concerned with the industry.

**W H Mosley Isle**
**Chairman**
**Economic Development Committee**
**for the Wool Textile Industry**

**W H Mosley Isle CBE**
**Chairman**
**Economic Development Committee**
**for the Wool Textile Industry**

**12 May 69**

Dear Mr Isle,

The Marketing Study Steering Group was formed as a sub-committee of the EDC to institute, direct and supervise a study of the marketing and productive processes needed to meet the market requirements of all the sections of the wool textile industry and to make reports and recommendations to the EDC and the industry.

The study was carried out for the Steering Group by W S Atkins & Partners, a firm of planning consultants. They were guided by an executive committee drawn from the Steering Group to ensure that on a basis of complete confidentiality they had all avenues open to them for the collection of information. In addition the consultants received a great deal of assistance from individual members of the industry and those connected with it and particularly those who served on the twenty-one advisory panels convened during the various phases of the study. The degree of the participation of the industry is indicated by the list of those who served which is given in this report.

The consultants submitted their report to the Steering Group on 12 May 1969. It presents their own independent assessment of the present situation together with their recommendations for the future of the Wool Textile Industry.

The Steering Group have pleasure in commending this report to the EDC and the industry and urge all firms and organisations in the industry to give it their very serious consideration.

Finally, the thanks of the Steering Group, its executive committee and indeed the whole industry are due to the consultants for the professional and conscientious way in which they have carried out their detailed investigation of this complex industry.

Yours sincerely,

WP Bulmer.

**W P Bulmer**
**Chairman**
**Marketing Study Steering Group**

# Introduction

In July 1966, the Economic Development Committee for the Wool Textile Industry decided to set in motion a broadly-based study of the industry, and especially of its marketing policies. Following discussions between the Chairman of the EDC and representatives of the industry's associations and trades unions, a Marketing Study Steering Group was formed in May 1967 under the chairmanship of Mr W P Bulmer. Later in the year the National Economic Development Office, acting on behalf of the Steering Group, commissioned us as consultants for the study, and work was commenced at the beginning of January 1968.

The terms of reference given to us were '. . . to establish the level of the industry's prosperity, to determine the factors relevant to this, and to provide guidance towards a more profitable future.' The study was thus conceived in strategic terms, looking to the middle- and long-term future of the industry; it was aimed at uncovering the boldest measures which might safeguard the industry's future and raise its profitability. The study was to be for the industry as a whole, and the report directed to the industry through the Marketing Study Steering Group. However, it was recognised that action following the study could only be taken by the great number of companies and other autonomous bodies which find themselves in quite different situations. It was, therefore, planned that the report should concentrate as much on facts and arguments as on conclusions and recommendations, so that each body has the requisite information to produce its own plan.

The study, which took just over a year to complete, was conceived as a four-phase operation. Phase 1 was for fact-finding about the industry and its environment; Phase 2 was for predictions of the future; Phase 3 was for formulation of conclusions concerning future policies of the industry, and Phase 4 was for the preparation of this final report with recommendations.

Throughout the study we have had very close contact with the industry. The proposed method of study and its organisation were introduced to the industry at a conference held at Bingley in Yorkshire, attended by members of the Steering Group, together with elected and executive officers of federations, trades unions and central services. The Steering Group's Executive Committee have had sixteen periodic meetings with us at which the overall conduct of the study has been discussed and agreed. For the more specialised aspects of the study, twenty-one Advisory Panels were set up, each consisting of about twelve members drawn from companies, federations, trades unions, central services and Government departments. Thirteen of these panels related to the first phase, three to the second phase and five to the third phase of the study. Each panel held several meetings with us before working reports were prepared on the various specialised subjects.

Three questionnaires were sent out during the fact-finding phase. Response to the preliminary questionnaire, designed to establish the present structure of the industry and employment within it, achieved the magnificent level of 92 per cent when measured in terms of manpower. The financial questionnaire sent to all autonomous firms achieved a response of 60 per cent, and the detailed technical questionnaires sent to all operating establishments brought responses of between 30 and 60 per cent from the various sectors of the industry. Our team during this phase consisted of twenty-four economists and engineers. They visited about two hundred companies in Yorkshire, Scotland and the West of England. Members of the industry also visited us at our temporary offices opened for the purpose in Bradford. Members of the team also visited the USA, Canada, Sweden, West Germany, Austria and Denmark. We have, of course, held in the strictest confidence all facts and opinions relating to individual people and companies.

In February 1969, when the work of the first three phases had been completed, a special two-day residential conference was held with the Executive Committee at Ilkley in Yorkshire for detailed discussion of our conclusions. This conference helped greatly in the formulation of our final recommendations, and a great measure of agreement was reached. However, the conclusions and recommendations given in this report represent our own views, and do not necessarily reflect the corporate view of any other organisation connected with the study.

We have received direct help from the Management Services Centre of the industry, who undertook certain work in connection with production economics, and from the Wool Industries Research Association on various technological matters. Mr A Dubs of J Walter Thompson Co Ltd has been our consultant on marketing methods and promotion, and Mr J Barritt, previously deputy director of the Wool Industries Research Association, Mr M B Cauthery, previously head of the Wool Industry Bureau of Statistics, and Professor P P Townend of Leeds University have been our consultants on technical matters. We gratefully acknowledge the valuable contributions they have made.

We also wish to acknowledge the very great help and co-operation we have received from the chairman and members of the Steering Group and its Executive Committee, and the chairmen and members of the Advisory Panels, who have made their experience freely available, acting individually as well as collectively. We have received a great deal of information and advice from Government departments and Embassies, from the Wool Industry Bureau of Statistics, and from the other central services of the industry, and the various associations and trades unions. Success in the earlier parts of the study was, of course, largely due to the interest and co-operation of the large number of firms within the industry who gave us information or received us for discussions.

We thank the fibre suppliers for the help they have given, particularly the International Wool Secretariat and ICI Fibres Ltd who have made available much of their own research work and market forecasts. We also thank the machinery manufacturers and customers of the industry who have made time available to give us advice and information; we would particularly like to mention the Association of Wholesale Woollen Merchants, to whom special reference is made in the first Appendix. Finally, we wish to thank the staff of the National Economic Development Office who, in providing the central administration of the study, have given us so much direct help and support.

W S ATKINS & PARTNERS

Epsom
15 April 1969

# Summary of principal recommendations

1 *The industry should plan to increase its output of converted tops, worsted yarns, semi-worsted yarns and non-woven fabrics, but decrease its output of combed tops and woollen woven fabrics. The industry should also diversify into the production of knitted fabrics.*

2 *The industry should invest about £40 million in re-equipment by 1975. £14 million of this should be for replacement of existing weaving capacity by new pirnless looms. Another £14 million should be for new spinning plant. The rest should be for knitting equipment, dyeing and finishing equipment, tow-to-top converters and a variety of general improvements. More than half of this money can be raised by reducing the present working capital; the remainder can be raised by long- and short-term borrowing.*

3 *It is suggested that Government should be asked to aid modernisation by raising the investment grant for certain new plant purchased by the industry to 40 per cent for a limited period.*

4 *More shift working should be introduced, and sectors with substantial re-investment should plan for round-the-clock working.*

5 *Managements and Trades Unions should strive for high manpower productivity, on existing as well as new plant, thus enabling remuneration levels and other conditions of employment to be improved to compete with other industries.*

6 *As a result of higher productivity, the industry's manpower should be reduced from the present 144,000 to about 121,000 by 1975—mainly by natural wastage.*

7 *Liquidation of unprofitable businesses—or their movement into other activities—should be encouraged. A subsidised advice centre, able to draw on bankers and consultants, should be set up to advise companies on mergers and liquidation.*

8 *The number of productive establishments in the industry should be reduced by about 40 per cent, thus compensating for increased productivity and shift working in the remaining establishments.*

9 *There should be an increased measure of horizontal integration, particularly amongst the smaller companies. There is also scope for some further vertical integration amongst the larger companies. As a result of these changes it is proposed that the number of independent organisations (i.e. companies and partnerships) should decrease from 1,000 at present to about 600 by 1975. More radical integration is not recommended.*

10 *Companies should adopt a much higher rate of return on capital as a minimum criterion to be used in evaluating further capital investment. They should refrain from investing in low-profit projects.*

11 *There should be a substantial increase in the training of senior and junior management to make good certain weaknesses in modern scientific techniques. There should also be an increased interchange of senior management with other industries.*

12 *Much greater standardisation of product ranges—particularly for tops and yarns—should be established for the major part of production; however, standards should not be used to such an extent that variety of designs and qualities of finished fabrics is perceptibly impaired.*

13 *Companies should combat their weak selling position by specialising more in the products and services they offer, thus increasing run lengths and efficiency, and decreasing the number of competitors in any given product.*

*14 There should be more direct selling to customers particularly overseas. Joint marketing companies are proposed for use by companies too small to engage in effective direct selling abroad.*

* * *

*Recommendations are also made concerning import tariffs levied on wool textile products entering the United Kingdom. To avoid prejudicing international negotiations, or negotiations between the industry and Government, these recommendations are made in a separate confidential report to the Marketing Study Steering Group.*

# Contents

Page
LIST OF ILLUSTRATIONS xvii
LIST OF TABLES xix
DEFINITIONS AND ASSUMPTIONS xxi
SYNOPSIS OF THE REPORT xxiii

## PART ONE THE INDUSTRY AT PRESENT

### CHAPTER 1 PRESENT PRODUCTION AND FACILITIES

1.1 The processes and products of the industry 3
1.2 Present levels of production 5
1.3 Combed top production 8
1.4 Tow-to-top conversion 9
1.5 Worsted spinning 9
1.6 Production of woollen yarns 11
1.7 Production of semi-worsted yarn 12
1.8 Weaving and finishing 13
1.9 Production of other non-woven fabrics 14
1.10 Dyeing 15
1.11 Stocks and work in progress 17
1.12 Capacities of the industry 18

### CHAPTER 2 PRESENT MANPOWER AND MANAGEMENT

2.1 The manpower of the industry 21
2.2 Recruitment and turnover of manpower 23
2.3 Remuneration and conditions of employment 25
2.4 Productivity 27
2.5 Training 28
2.6 Management and organisation 30
2.7 Use of management control systems 31

### CHAPTER 3 MARKETING AT PRESENT

3.1 The industry's products 34
3.2 The markets 34
3.3 Customers of the industry 35
3.4 Marketing in the United Kingdom 38
3.5 Marketing overseas 41
3.6 Marketing within the industry 42
3.7 Design and sample-making 43
3.8 Promotion 44
3.9 Price determination and conditions of contract 45
3.10 Procurement of raw materials 46

*Page*

### CHAPTER 4 PRESENT STRUCTURE OF THE INDUSTRY

4.1 Establishments and organisations 49
4.2 Horizontal and vertical integration within the industry 52
4.3 Relationships with other industries 54
4.4 Pattern of ownership 55
4.5 Geographical distribution 56
4.6 Central services of the industry 56
4.7 Employers' Associations 60
4.8 Trades Unions 63

### CHAPTER 5 FINANCE AND PROFITABILITY

5.1 The assets of the industry 64
5.2 Sources of the existing capital 67
5.3 The industry's income 70
5.4 Profitability 72
5.5 Cash flows and capital investment 77

## PART TWO THE INDUSTRY'S MARKETS

### CHAPTER 6 FORECASTS OF UNITED KINGDOM CONSUMPTION

6.1 Present trends in the pattern of consumption 83
6.2 Development of consumer expenditure 84
6.3 Fundamental consumer requirements 86
6.4 The economics of customer choice 87
6.5 Consumption of apparel fabrics 89
6.6 Consumption of non-apparel fabrics 94
6.7 Consumption of carpet yarns 95
6.8 Consumption of hand knitting yarns 96
6.9 Summary of the forecasts 96

### CHAPTER 7 INTERNATIONAL COST COMPETITIVENESS

7.1 Forecasting trading competitiveness 99
7.2 Basic costs at home and abroad 101
7.3 Assessment of competitiveness in an overseas market 107
7.4 United Kingdom competitiveness in tops 111
7.5 United Kingdom competitiveness in yarns 115
7.6 United Kingdom competitiveness in fabrics 121
7.7 Consequences of joining the Common Market 126

### CHAPTER 8 FUTURE SALES OF THE UNITED KINGDOM INDUSTRY

8.1 Present patterns of international trade 130
8.2 International trade and competitiveness 133
8.3 Government policies in relation to trade 135
8.4 Export opportunities for the United Kingdom 137
8.5 Competition in the home market 140
8.6 Future levels of United Kingdom production 142

Page

## PART THREE FUTURE OF THE INDUSTRY'S PRODUCTION

### CHAPTER 9 PRODUCTION OF TOPS

9.1 Processes for producing tops 147
9.2 Wool sorting 148
9.3 Scouring of worsted raw materials 149
9.4 Worsted carding 151
9.5 Combing 152
9.6 Tow-to-top conversion 154
9.7 The future of top production 155

CHAPTER 10 PRODUCTION OF WORSTED YARNS

10.1 Processes for making worsted yarn 159
10.2 Worsted drawing and spinning 160
10.3 Worsted twisting and winding 162
10.4 Filament modification 163
10.5 Future of worsted yarn production 164

CHAPTER 11 PRODUCTION OF WOOLLEN AND SEMI-WORSTED YARNS

11.1 Processes for making woollen and semi-worsted yarns 168
11.2 Treatment of woollen raw materials 170
11.3 Woollen slubbing production 172
11.4 Woollen spinning, twisting and winding 172
11.5 Semi-worsted yarn production 173
11.6 The future of woollen and semi-worsted yarn production 174

CHAPTER 12 FABRIC MANUFACTURE AND FINISHING

12.1 Fabric manufacturing processes 178
12.2 Warp and weft preparation 179
12.3 Weaving 180
12.4 Knitting 183
12.5 Production of other fabrics 184
12.6 Burling and mending 186
12.7 Finishing 187
12.8 The future of fabric manufacture and finishing 188

CHAPTER 13 COLOURATION

13.1 Processes for dyeing 191
13.2 Loose-stock dyeing 192
13.3 Top dyeing 193
13.4 Yarn dyeing 194
13.5 Piece dyeing 195
13.6 The future of alternative dyeing procedures 196

CHAPTER 14 INTER-PROCESS ACTIVITIES

14.1 Stockholding 199
14.2 Materials handling 201
14.3 Package sizes and tare 203
14.4 Transport 205
14.5 Mill buildings 207

Page

## PART FOUR FUTURE OF MARKETING AND ORGANISATION

### CHAPTER 15 MARKETING AND BUYING POLICIES

15.1 Aspects of marketing 211
15.2 Elimination of weak selling 212
15.3 Specialisation in production and sales 213
15.4 Rationalisation of product ranges 215
15.5 Channels of distribution 217
15.6 Geographic concentration of sales 218
15.7 Service to customers 219
15.8 Pricing policies and conditions of sale 220
15.9 Use of advertising and promotion 221
15.10 Product diversification 222
15.11 Buying and merchanting of raw materials 223

### CHAPTER 16 MANPOWER AND MANAGEMENT POLICIES

16.1 Future manpower requirements 225
16.2 Changes in shift systems 226
16.3 Manpower recruitment and training policies 228
16.4 Improvements in company controls 229
16.5 Improvements in company organisation 231
16.6 Management of multi-establishment groups 232
16.7 Recruitment and training of management 233
16.8 Use of advisory services 235

### CHAPTER 17 FINANCIAL POLICIES

17.1 Future capital requirements 237
17.2 Finance available to the industry 239
17.3 Government incentives to investment 242
17.4 Decapitalisation of sectors 243
17.5 Investment appraisals 245
17.6 Financial options for companies 246

### CHAPTER 18 CHANGES IN THE STRUCTURE OF THE INDUSTRY

18.1 Factors relating to structure 250
18.2 Marketing pressures for structural change 250
18.3 Management and structure 251
18.4 Finance and structure 252
18.5 Production and structure 252
18.6 Horizontal and vertical integration 253
18.7 Acquisition of market outlets 255
18.8 The place of commission operators 256
18.9 The place of merchants 259
18.10 Future structure of the industry 260
18.11 Future of the central services and associations 261

### APPENDICES

Acknowledgements to the Association of Wholesale Woollen Merchants 267
Membership of the Marketing Study Steering Group 269
Membership of the Advisory Panels 270

# List of illustrations

Page

1.1 Boundaries of the industry 4
1.2 The primary processes and materials 5
1.3 Present levels of production 6

2.1 Recent employment trends 21
2.2 Age distribution of present employees 23
2.3 Distribution of weekly earnings in 1960 25

3.1 The industry's customers 36
3.2 Marketing channels 39
3.3 Recent history of raw material prices 47

4.1 Size distributions of establishments and organisations 50
4.2 The central organisations of the industry 61

5.1 Turnover and profitability in recent years 73
5.2 Profit appropriations 73

6.1 Recent history of United Kingdom consumption 83
6.2 Trends in consumption of floor coverings 95

7.1 Representative producers and consumers 102
7.2 Overseas production costs for a worsted cloth 108
7.3 Overseas production costs for a merino top 112
7.4 Overseas production costs for yarns 117
7.5 Overseas production costs for fabrics 124

8.1 International trade in tops and yarns 131
8.2 International trade in woven fabrics 132
8.3 Proposed levels of production in the mid-1970's 143

9.1 Process routes for making tops 147
9.2 Comparative costs of worsted scouring 150
9.3 Comparative costs of worsted carding 151
9.4 Comparative costs of combing 153
9.5 Costs of tow-to-top conversion 155
9.6 Economics of scale in top production 156
9.7 Economics of batch size in top production 157

10.1 Process routes for worsted spinning 159
10.2 Comparative costs of worsted drawing and spinning 161
10.3 Comparative costs of worsted twisting and winding 163
10.4 Economics of scale in worsted yarn production 165
10.5 Economics of batch size in worsted yarn production 166

11.1 Process routes for making woollen and semi-worsted yarns 169
11.2 Costs of woollen blending and carding 171
11.3 Comparative costs in woollen spinning and twisting 173
11.4 Costs of semi-worsted yarn production 174
11.5 Economics of scale in woollen yarn production 175
11.6 Economics of batch size in woollen yarn production 176

| | | Page |
|---|---|---|
| 12.1 | Process routes for manufacturing fabrics | 178 |
| 12.2 | Comparative weaving costs | 181 |
| 12.3 | Economics of batch size in weaving | 182 |
| 12.4 | Costs of knitting | 184 |
| 12.5 | Economics of scale in manufacturing | 188 |
| 13.1 | Comparative costs of loose-stock dyeing | 192 |
| 13.2 | Comparative costs of top dyeing | 194 |
| 13.3 | Comparative costs of yarn dyeing | 195 |
| 13.4 | Comparative costs of piece dyeing | 196 |
| 16.1 | Organisation of a multi-establishment group | 233 |
| 17.1 | Effect of over-capacity on profitability | 244 |
| 18.1 | Effect of vertical integration on production | 255 |
| 18.2 | Suggested structure of the central organisations | 264 |

# List of tables

| | | Page |
|---|---|---|
| 1.1 | Present use of raw materials | 7 |
| 1.2 | Plant used in top production | 8 |
| 1.3 | Plant used in worsted spinning | 10 |
| 1.4 | Plant used in woollen yarn production | 11 |
| 1.5 | Plant used in semi-worsted yarn production | 13 |
| 1.6 | Plant used in weaving and finishing | 14 |
| 1.7 | Plant used in dyeing | 16 |
| 1.8 | Capacity of existing plant | 19 |
| 2.1 | Functional analysis of the manpower | 22 |
| 2.2 | Claims to the Training Board in 1965-66 | 29 |
| 2.3 | Training in relation to establishment size | 29 |
| 3.1 | Markets at home and overseas | 35 |
| 3.2 | Home markets for yarns | 36 |
| 3.3 | Home markets for fabrics | 37 |
| 4.1 | Size distribution of establishments in the divisions | 50 |
| 4.2 | Size distribution of organisations in the divisions | 51 |
| 4.3 | Vertical integration in the industry | 53 |
| 4.4 | Public and private companies in the industry | 55 |
| 4.5 | Trends in company status | 55 |
| 5.1 | Book value of the industry's assets | 65 |
| 5.2 | The industry's sources of capital | 68 |
| 5.3 | Capital and company size | 69 |
| 5.4 | Capital and company status | 69 |
| 5.5 | Revenues during recent years | 70 |
| 5.6 | Commission working in the industry | 71 |
| 5.7 | The industry's profits | 74 |
| 5.8 | Profitability in recent years | 75 |
| 5.9 | Profit appropriations in 1967 | 75 |
| 5.10 | Profitability and company location | 76 |
| 5.11 | Capital investment in recent years | 78 |
| 5.12 | Financing recent investments | 79 |
| 6.1 | Growth of United Kingdom population | 84 |
| 6.2 | Forecast of expenditure on clothing | 85 |
| 6.3 | Forecast of home consumption of men's outerwear | 90 |
| 6.4 | Use of fabrics in men's outerwear | 90 |
| 6.5 | Forecast of home consumption of women's outerwear | 91 |
| 6.6 | Use of fabrics in women's outerwear | 92 |
| 6.7 | Use of fabrics in children's wear | 93 |
| 6.8 | Use of yarns in carpets | 96 |
| 6.9 | Summary of forecasts of home consumption of fabrics | 97 |
| 6.10 | Summary of forecasts of home consumption of yarns | 97 |
| 6.11 | Fibre usage in yarns | 98 |
| 7.1 | Summary of basic cost indices | 101 |
| 7.2 | Computation of wages and salaries indices | 104 |

Page

7.3 General rates of import tariffs 106
7.4 The cost of producing a worsted cloth in Japan 107
7.5 Costs of the worsted cloth in the Swedish market 109
7.6 International competitiveness in a merino top 113
7.7 Sensitivity of competitiveness in tops to manpower costs 115
7.8 International competitiveness in a worsted yarn 118
7.9 International competitiveness in a woollen yarn 120
7.10 International competitiveness in a worsted woven fabric 122
7.11 International competitiveness in a woollen woven fabric 125
7.12 International competitiveness in a double-jersey fabric 127
7.13 Competitiveness in worsted fabric with United Kingdom in EEC 128

8.1 Proposed sales from the industry in the mid-1970's 142
8.2 Proposed production levels in the mid-1970's 144

9.1 Output of tops in the mid-1970's 157
9.2 Top production plant in the mid-1970's 157
9.3 Mill size in top production 158

10.1 Output of worsted yarns in the mid-1970's 167
10.2 Worsted spinning plant in the mid-1970's 167
10.3 Mill size in worsted spinning 167

11.1 Output of woollen and semi-worsted yarns in the mid-1970's 176
11.2 Woollen and semi-worsted yarn production plant in the mid-1970's 177
11.3 Mill size in woollen and semi-worsted yarn production 177

12.1 Output of fabric in the mid-1970's 189
12.2 Fabric production plant in the mid-1970's 189
12.3 Mill size in fabric production 190

13.1 Changes in the pattern of dyeing 197
13.2 Dyeing plant in the mid-1970's 198
13.3 Levels of operation of dyeing establishments 198

14.1 The industry's stocks 201
14.2 Handling costs 202
14.3 Present use of transport facilities 206

16.1 Manpower required in the mid-1970's 226
16.2 Distribution of men and women 226
16.3 Shift working in the mid-1970's 227
16.4 Future manpower trends 228

17.1 Capital required for developments 237
17.2 Phasing of capital requirements 239
17.3 Borrowing power of the industry 241

18.1 Establishments in the mid-1970's 262
18.2 Companies in the mid-1970's 263

# Definitions and assumptions

The following definitions and assumptions have been used throughout the report, except where stated to the contrary.

*Value of the pound*
The value of the pound sterling has been taken as that ruling in the middle of 1968. Financial statistics for earlier years have been uplifted by the following multiplying factors to allow for inflation:

| *1967* | *1966* | *1965* | *1964* | *1963* | .. | *1938* |
|---|---|---|---|---|---|---|
| 1·03 | 1·06 | 1·10 | 1·14 | 1·17 | .. | 3·63 |

All costs, prices, taxes, tariffs and rates of exchange are taken at their levels prevailing in mid-1968.

*Conversion and comprehensive costs*
Throughout those parts of the report dealing with process cost comparisons, reference is made to 'comprehensive cost'. The concept of comprehensive cost is very useful for decision-making; but the term is not widely used in the industry, and some definition is therefore required. The 'conversion cost' of a process can be considered as being built up of the costs of manpower, consumable materials, maintenance materials, fuel and power, and overheads. However, this cost does not include the cost of the capital involved, or the profit expected. For decision-making purposes it is convenient to regard capital as a commodity which is hired for an annual charge, this charge taking into account the requirements of depreciation, taxation, interest, dividends and retained profits. By adding to the conversion cost of a process the charges on the capital employed, a new and all-embracing figure is obtained by which alternative processes can be realistically compared. This new figure is termed 'comprehensive cost'. It should be noted that the charge is only applied to capital required for new plant. Existing plant and other assets for which capital has irretrievably been committed must be treated as a heritage which exists whatever new strategy is adopted.

For the purpose of this study, the charge to be made on capital in a non-Development Area was agreed as 20 per cent per year. After allowing for the delays between spending the capital and achieving a normal year's profit, and after allowing for the expected commercial life of a project, this figure corresponds to a discounted-cash-flow rate of 12 per cent per year before the payment of corporation tax, taken to be at the rate of 42½ per cent in this report. The change to 45 per cent in the 1969 Budget will only slightly increase the capital charge. The 12 per cent discounted-cash-flow rate corresponds roughly with the general opportunity level of investment in British industry at present. The same level of business profitability (i.e. discounted-cash-flow rate of 12 per cent) can be achieved in the development areas with lower levels of capital charges, and the following have been assumed:

| | |
|---|---|
| New plant in existing buildings in a Development Area | 14 per cent |
| New plant and buildings in a Development Area | 16 per cent |

Conversion and comprehensive costs are quoted extensively in Part 3 of the report; but it should be pointed out that the costs are given only for the purposes of comparing alternative methods of production. The costs may not include certain overheads or cost recoveries which are reckoned to be the same for each alternative. For this reason the costs should not be used for establishing pricing policies, nor can they be compared with costs in individual companies.

*Forecasts*
In general, the report assumes that the United Kingdom will not be a member of the Common Market. Where this assumption is likely to have important consequences, such as in forecasts of exports, alternative estimates are given of the effect of membership.

Many parts of the report refer to 'present' statistics. The notion of 'present' refers to the condition of the industry in 1968, adjusted for trends in recent years. Thus if for a particular statistic 1968 was a particularly good or bad year, the figure would be lowered or raised accordingly to take into account what would have been regarded as normal for that year in the light of earlier history.

The year 1975 was regarded as being sufficiently far ahead for forecasting purposes without reducing the confidence limits on the forecasts to unacceptably low levels. However, the year should be regarded as being typical of the mid-1970's rather than as a specific year.

*Organisations and establishments*
For this purpose of studying the structure of the industry, a two-tier classification has been adopted, the two tiers being termed 'organisations' and 'establishments'. An organisation is defined as an independent firm not being subject to financial control from any other organisation within the industry. An establishment is defined as a mill, or productive or trading unit with a separate postal address; it may be a department, branch, or subsidiary company of an organisation, or it may be synonymous with the organisation itself. The great number of sub-groupings and subsidiary companies which lie somewhere between the establishment and the organisation are not considered relevant to the study.

# Synopsis of the report

*Present structure of the industry (Chapter 4)*
The Wool Textile Industry is made up of about 1,000 independent organisations which between them own some 1,470 establishments. As will be seen from the following statistics, about 15 per cent of the organisations are public companies or subsidiaries of more diverse organisations outside the industry. These classes of company tend to be larger than the industry's average, and therefore account for a higher proportion (i.e. 48 per cent) of the industry when measured in terms of the manpower involved. Although 85 per cent of the organisations are privately owned, they represent only 52 per cent of the industry's manpower. The great majority of these organisations are private limited companies, but a few are partnerships and individual proprietorships.

| *Type of independent organisation* | *Number* | *Average number of employees* | *Percentage of industry's manpower* |
|---|---|---|---|
| Independent public companies | 90 | 610 | 39 |
| Subsidiaries of companies outside the industry | 60 | 230 | 9 |
| Privately-owned companies and partnerships | 850 | 90 | 52 |
| | 1,000 | 140 | 100 |

About 70 per cent of the industry lies in the West Riding of Yorkshire, where it settled during the second half of the eighteenth century.* Cohesive groupings, with their own federations, also exist in Scotland, which has 11 per cent of the industry, and the West of England, which has 2 per cent.

*The production sectors (Chapter 1)*
The industry can be said to consist of five main production sectors, namely worsted top production, worsted spinning, woollen yarn production, worsted weaving and woollen weaving. There is also an important sector concerned with dyeing and finishing, and a number of others concerned with merchanting at various stages, waste processing, fellmongering and so forth. Although most organisations still confine their activities to one sector alone, there has been a slow trend towards vertical integration of facilities in single organisations. Vertical integration is particularly prevalent in the woollen system, where one organisation may have facilities for raw material preparation, spinning, weaving, dyeing and finishing.

*Present manpower (Chapter 2)*
As shown below the total level of employment in the industry now stands at about 144,000 –a figure which has been declining steadily from about 200,000 ten years ago. About 49 per cent of all employees are women.

---

*A survey of the history of the industry is given in *The Working Party Report on Wool*, 1947, HMSO.

| *Sector* | *Present manpower including management* |
|---|---|
| Worsted top production | 13,000 |
| Worsted spinning | 42,000 |
| Woollen yarn production (including materials preparation) | 27,000 |
| Worsted weaving and mending | 21,000 |
| Woollen weaving and mending | 27,000 |
| Dyeing and finishing | 10,000 |
| Others (including wool merchants, rag pullers, waste processors and fellmongers) | 4,000 |
| | 144,000 |

*Marketing at present (Chapter 3)*

The industry's main products are, of course, worsted and woollen cloth, which are sold to clothiers and makers-up either direct or through merchants and agents. The industry also provides substantial quantities of yarn to the hosiery and carpet industries, as well as providing hand knitting yarns for retail. In all these commodities, the industry satisfies about 95 per cent of the needs of the home market; in addition about 34 per cent of the industry's products are exported, as shown by the following figures:

| *Product* | *Present yearly sales in the UK* | *Present yearly exports* | *TOTAL sales from the industry* |
|---|---|---|---|
| Worsted cloth | £70 m | £28 m | £98 m |
| Woollen cloth | 69 | 39 | 108 |
| Worsted yarns | 59 | 11 | 70 |
| Woollen and semi-worsted yarns | 32 | 7 | 39 |
| Tops | – | 27 | 27 |
| Others | – | 8 | 8 |
| | £230 m | £120 m | £350 m |

*Present profitability (Chapter 5)*

Thus the turnover of the industry as a whole is about £350 m per year. This corresponds to an added value of about £179 m. In recent years this has yielded a gross profit of about £50 m or a net profit of, say, £17 m after allowances for depreciation and taxation. This net profit is earned on a present capital employed of £291 m (as measured from companies' balance sheets), thus giving a rate of return of about 6 per cent per year on capital.

*Forecast of United Kingdom consumption (Chapter 6)*

In studying demand for the products of the industry, a clear distinction must be made between the demand of the ultimate consumer and that proportion of demand which will be—or should be—satisfied by the British industry. The former is a part of the general environment, and cannot be influenced very much by the industry. However, the latter depends on the capacities and abilities of the industry and its marketing policies, which in turn should depend on how profitable it would be for the industry to satisfy all or part of the demand for each product. In dealing with the home market, the study was therefore undertaken in two distinct steps, the first being concerned with forecasting home consumption of goods, irrespective of whether they were to be made by the British industry, and the second concerned with the position of that market which the industry can profitably adopt.

During the last ten years, consumers' expenditure in the United Kingdom rose by 34·5 per cent in real terms, corresponding to an average annual growth rate of 3·0 per cent compound.

It is expected that this growth rate will continue in the future, thus giving a further growth of 27 per cent by 1975. However, the forecast growth for clothing is estimated as only 22 per cent, for two main reasons. Firstly, experience throughout the world has shown that as incomes rise in a developed country, the proportion of income spent on food and clothing tends to decline in favour of durables, recreation and services. Secondly, the post-war population bulge which lay in the 20 to 29 age bracket during the last ten years will soon be moving into a higher age bracket which spends less on clothing. Within this general forecast, the demands for the various categories of clothing have been studied in more detail, leading to the following figures:

| *Category* | *Present annual expenditure* | *Forecast for 1975* | *Expected growth* |
|---|---|---|---|
| Men's outerwear | £346 m | £422 m | +22% |
| Men's underwear and hose | 163 | 172 | +6 |
| Women's outerwear | 527 | 738 | +40 |
| Women's underwear and hose | 216 | 234 | +9 |
| Children's wear | 177 | 210 | +19 |
| Infants' wear | 89 | 118 | +32 |
| Hats, gloves, etc. | 228 | 228 | – |
| ALL CLOTHING | £1,746 m | £2,122 m | +22% |

Not all of these categories are of direct interest to the wool textile industry, but those that are have in turn been further broken down into individual garments (such as trousers, jackets and topcoats) so that forecasts could be made of the numbers of garments, and hence of the area of cloth required.

Forecasts have also been made of the demand for the other products of the industry. As is shown by the following figures, there is likely to be an important increase in the demand for carpet yarns, most of this being in semi-worsted yarns for tufted carpets. The demand for tufted carpets is expected to increase at a spectacular rate, mainly at the expense of linoleum and the harder floor finishes. The demand for woven blankets is expected to fall significantly, partly because of central heating in houses, and partly because of the increasing use of non-woven blankets.

| *Category* | *Present consumption (m lb a year)* | *Forecast for 1975 (m lb a year)* | *Expected growth (per cent)* |
|---|---|---|---|
| Upholstery cloths | 17 | 19 | +12 |
| Woven blankets | 18 | 9 | –50 |
| Carpet yarns | 178 | 256 | +44 |
| Hand knitting yarns | 41 | 46 | +12 |

To interpret these forecasts into equivalent future home consumption of wool textile products, a view had to be taken on the types and relative proportions of different fabrics (i.e. worsted woven, woollen woven and knitted) likely to be used in each garment. A view also had to be taken on the extents to which the products will contain animal fibres, man-made staple and continuous filament man-made fibres.

In making all these forecasts, it has been necessary to bear in mind the changing pattern of consumer requirements resulting from a different mode of living. The increasing purchasing power will encourage a much higher proportion of the population to purchase more specialised garments, particularly for leisure wear. The increasing purchasing power will also increase the rate of change of fashion, and will correspondingly stimulate impulse buying, particularly of the less costly garments. Easy care properties are increasingly being regarded as important, particularly with the increasing use of home washing machines and the desire to avoid domestic work such as ironing. The increasing number of homes with central heating, and the increased use of heated cars, will continue to decrease the demand for warmth as one of the important features of clothing. In addition to technical requirements of this sort, the different costs of fabrics and fibres will affect consumer choice. A study has therefore been made of the likely comparative future costs of knitted as opposed to woven fabrics, and of man-made as opposed to natural fibres.

As a result of these surveys, it has been estimated that the UK consumption of wool textile products is likely to develop as shown below:

| *Product* | *Present consumption (m lb a year)* | *Forecast for 1975 (m lb a year)* |
|---|---|---|
| *Fabrics:* | | |
| Worsted woven fabrics | 69 | 63 |
| Woollen woven fabrics | 131 | 115 |
| Knitted fabrics | 56 | 100 |
| *Yarns (excluding those for fabrics):* | | |
| Worsted yarns | 106 | 122 |
| Woollen yarns | 135 | 143 |
| Semi-worsted yarns | 39 | 93 |

It will be noticed that knitted fabrics are included here, although they hardly constitute a significant product of the industry at present. We will show later that knitted fabrics give the industry an important opportunity for diversification, as they are expected to increase their proportion of the fabric market at the expense of woven cloths.

*International cost competitiveness (Chapter 7)*

The question now arises as to how much of this home market can be satisfied by the British industry—or rather, how much the British industry should attempt to satisfy as an act of policy aimed towards maximum profitability of the industry. To answer this question it is necessary to gain some understanding of the likely future pattern of international competitiveness in wool textiles. A knowledge of international competitiveness is also a vital step in establishing a future policy for exports. Indeed, the future level of exports depends more on cost competitiveness than on any forecast of growth in consumption overseas, since the world markets are huge in relation to any likely British production capacity.

In assessing the likely future pattern of international competitiveness, the first step was to establish and compare the basic costs of commodities involved in making wool textiles in a number of typical production centres of the world. These include the costs of manpower, management, raw materials, fuel and power, and the cost of raising capital. They all vary from country to country, but manpower has by far the greatest variation, and hence the greatest influence on differences in production cost. Manpower cost in the United Kingdom wool textile industry (after allowing for holidays and other social payments) is much higher than in certain developing countries; for example it is four times as costly as in Portugal, and nearly twice as costly as in Japan. However, it is slightly less costly than in any member of the EEC and most members of EFTA. In the USA, manpower in textiles costs more than twice as much as it does in the United Kingdom.

From the basic costs, it was possible to work out the costs of making a typical product in a selected range of producing countries, on the assumption that each country would use the most economic practice—a reasonable assumption for the future, especially for a number of the more efficient businesses in each country which would tend to establish the price levels.

The next step was to compare the performance of the different producing countries when competing in a specified market. To do this, international tariffs and transport costs were added to the national production costs. All these calculations have been made for 16 different producing countries competing in 24 different markets with 6 different products including fabrics, yarns and tops. The figures given below set out, as an example, the more important results of the calculations for a typical medium-quality worsted fabric. The figures give the relationship (as a percentage) between the profit that a producing country can expect in a market compared with the normal level of profit required by a healthy business (in the United Kingdom taken as 20 per cent per year before tax and depreciation). Thus a figure of 100 represents normal profit, a figure less than 100 represents a smaller return on capital, and a negative figure represents a loss. A figure greater than 100 indicates a profit level which should encourage expansion to grasp the opportunities.

| *Market place* | *UK* | *Some typical potential competitors* |
|---|---|---|
| United Kingdom | 100 | Portugal (160); S Africa (160); Japan (80) |
| EFTA (except Portugal) | 100 | Portugal (160); S Korea (90); Japan (70) |
| Canada | 80 | S Africa (140); Japan (100); Canada (100) |
| USA | 60 | S Korea (130); Japan (100); USA (100) |
| EEC | 50 | S Korea (130); Portugal (120); France (100) |
| USSR | 50 | S Korea (130); Japan (100); USSR (50) |
| Hong Kong | 40 | S Korea (130); Portugal (110); Japan (100) |
| Japan | −140 | Japan (100); S Korea (−50); S Africa (−70) |
| S Africa | −130 | S Africa (100); S Korea (−50); Portugal (−70) |

It will be noticed that Portugal and South Africa have potentially strong economic advantages in selling in the United Kingdom—even compared with the home industry. However, it is not thought that either country will expand and improve its wool textile industries sufficiently by the mid-1970's to take advantage of this situation, so that the home industry will continue to set the price levels, thus being entitled to a normal return on capital. Nevertheless these countries and others like them can be expected to expand their industries in the course of time, and they therefore give a serious risk of future competition. It is interesting to note that Japan can be expected to sell into the United Kingdom with only slight disadvantage (80 per cent of the normal profit level). However, Japan's attention may be kept away from the United Kingdom because she has more favourable export markets in countries like the USA and Canada, where she can expect 100 per cent of normal profit level.

The figures explain well why the United Kingdom has been losing its markets in the USA to Japan, as Japan shows a potential of 100 per cent of normal profit there compared with 60 per cent for the United Kingdom. Furthermore, the figures show the United Kingdom as having more favourable profitabilities in EFTA and Canada, which again matches the fact that our trade with those areas has not suffered as it has in the USA. The United Kingdom's strength in EFTA (except Portugal) results from freedom from tariffs and slight advantages in the costs of manpower and capital.

The figures given above for Hong Kong are typical of those for many developing countries where there are no external tariff preferences. Certain countries in the Middle East, Africa and South America come in this category. The producing countries listed are only typical, and it should be remembered that other producers with low manpower costs, such as Egypt, India, Taiwan and Spain will be able to expand into world markets.

It is interesting to compare the fact that Japan is at present a valuable market for woven cloths—particularly fine worsteds—with the economic calculations of potential competitiveness. It should be recognised of course that world trade also depends on other factors such as reputations of producing countries, and the natural demand for variety. However, these should be a warning that such markets as Japan may be lost as they build up their own production capacity and reputation.

*Proposed future levels of output (Chapter 8)*

The vulnerability of the United Kingdom to certain developing countries eating into its home market is not considered to be too serious, at least up to the mid-1970's. It is therefore anticipated that United Kingdom industry will enjoy a high percentage of the home market as it has done in the past—generally about 95 per cent, except for woollen cloth for which the figure will be about 80 per cent. It would not be wise to attempt to raise these figures nearer to 100 per cent, as this could only be done by lowering prices to an extent which would persuade buyers to relinquish their freedom of choice.

Not all of the products are made exclusively by the wool textile industry. For example, the woven and tufted carpet industries make some of their own yarns; it has been assumed that they will continue to make the same proportions in the future as in the past. As has been said already, it is recommended that the wool textile industry should enter the knitting business to a significant extent. It is proposed that the industry should take up the majority of the future growth in knitting of spun yarns and a small proportion of the growth in knitting of filament yarns, thus taking, say, one-third of the total growth and leaving the other two-thirds to the established knitting industry.

The arguments are more complex in establishing a future level for exports. The studies of international competitiveness have shown that there is no general basis for building new plants to satisfy overseas markets, as none would give a satisfactory profit level on the capital involved. However, where production facilities already exist as a heritage and are reasonably efficient, there is good business to be done by exporting at some profit level less than would be required in an expanding industry. The figures given above show that the large markets of EFTA, the EEC, Canada, the USA, the USSR (to whatever extent they will allow) and other countries offer profitable opportunities for existing mills so long as some sacrifice is made on return on capital. Indeed, it is good business practice to use surplus existing capacity in this way, so long as it is making some positive profit. Only when the profit is zero or less (before allowing for depreciation on committed assets) should trading cease.

On this basis, and because of our weaker potential competitiveness in overseas markets, there is no general justification for investing in new plant for exports. (Of course some companies with strong sales abroad may find exceptions to this rule.) The best level of exports for the industry as a whole is therefore set by the viable surplus capacity after allowing for home sales. Thus, to determine exports involves knowledge of future production facilities and capacities, and this will be discussed later. However, the conclusion has been reached that United Kingdom exports should rise slightly by the mid-1970's to reach the levels given below.

| *Product* | *Yearly sales in the UK (lb million)* | *Yearly exports (lb million)* | *TOTAL sales from the industry (lb million)* |
|---|---|---|---|
| Scoured wool | – | 15 | 15 |
| Combed tops | – | 45 | 45 |
| Converted tops | – | 15 | 15 |
| Worsted yarns | 98 | 18 | 116 |
| Woollen yarns | 62 | 18 | 80 |
| Semi-worsted yarns | 37 | – | 37 |
| Worsted woven fabrics | 60 | 19 | 79 |
| Woollen woven fabrics | 93 | 33 | 126 |
| Knitted goods | 24 | – | 24 |
| Other fabrics | 11 | – | 11 |

With these figures it is now possible to work out the production level required of each sector in the mid-1970's and to observe whether this entails expansion or contraction. The figures are given below; for the fabrics the production levels correspond with the sales levels given above, but for the yarns and tops the requirements of other sectors of the industry are included.

| *Sector* | *Present production (m lb a year)* | *Mid-1970's production (m lb a year)* | *Expected growth (per cent)* |
|---|---|---|---|
| Combing | 202 | 175 | −13 |
| Converted top production | 55 | 91 | +66 |
| Worsted spinning | 201 | 217 | +8 |
| Woollen yarn production | 217 | 216 | – |
| Semi-worsted yarns | 15 | 37 | +146 |
| Worsted weaving | 80 | 79 | −1 |
| Woollen weaving | 138 | 126 | −10 |
| Knitting | – | 24 | great increase |
| Other fabric production | 6 | 11 | +83 |

It will be noticed that significant expansions are proposed for tow-to-top conversion, worsted spinning, semi-worsted spinning and knitting, but that small but significant declines are proposed for combing and woollen weaving. For this production, the industry should plan for its purchases of raw wool and hair to fall from 352 million lb clean per year at present to 310 million lb by the mid-1970's, and for its purchases of man-made fibres to rise from 127 million lb per year to 204 million lb in the same period.

Calculations have shown that there would be a small but significant advantage to the industry if the United Kingdom were to join the European Economic Community; but the whole question of tariffs should be kept under careful review. The study has led to a number of observations and recommendations concerning United Kingdom import tariffs on raw materials for the industry and on certain wool textile products. However, these are the subject matter of a separate confidential report so that neither international negotiations nor negotiations between the industry and Government are prejudiced.

### *Production of tops (Chapter 9)*

Four of the major areas for decision-making when considering production strategies to meet the levels of output given above are as follows:

(a) What sort of machinery would be the most economic taking into account quality of product?

(b) If the ideal machinery is different from that which exists, should investment be made in the replacement?

(c) Should the machinery be operated on a single, double or multi-shift basis?

(d) Where should the mill be situated; for example should it be in a Development Area, thus gaining certain financial advantages?

All of these decisions are interrelated. For example, the choice of plant depends on the number of shifts, since multi-shift operation favours capital intensive plant, while single-shift operation favours labour intensive plant.

Studies have been made of these aspects for each sector of the industry in turn, and as a result it is now possible to make general recommendations concerning re-equipment of the sectors and their modes of operation.

Seventy per cent of the British top production and spinning is based on the oil system in which 1½ to 3 per cent of oil by weight is added to the fibres before combing. Most other countries use a dry system which has certain advantages. Although there is little, if any, saving in the combing costs, spinning and dyeing costs are reduced, package yarn dyeing becomes more attractive, and it is easier to satisfy the growing demands of the knitting industry. It is therefore proposed that the top-production sector should plan for a steady long-term change towards the dry system, except where it is required for certain specialities.

British practice is based largely on the use of Noble combs, which have been developed and manufactured in the United Kingdom since the middle of the nineteenth century. Indeed the development of this comb gave Britain a substantial technological lead in the worsted trade during the Industrial Revolution. However, most other countries now base their production in the use of French rectilinear combs–a type of equipment to which much world research effort is now being devoted.

Existing French combs should be put onto multi-shift operation, and any new equipment purchased should be on the French system. To balance capacity with demand, some of the Noble combs should be taken out of production; and others can be brought back towards day-working to release shift workers for duties where there is greater economic need.

*Production of worsted yarns (Chapter 10)*
Comparative cost calculations have shown that ring spinning with multi-shift operation is the most economic method of producing worsted yarns. By a small margin, it will be profitable even to scrap modern and efficient cap and flyer spindles in favour of new ring spindles. It is therefore recommended that the worsted spinning sector should plan for a steady transition towards the use of ring spindles for most of its production, but excluding of course those products where there are technical reasons for using an alternative. Cap spinning should continue to be used for the very fine yarns, and flyer spinning should continue to be used for hand knitting yarns because of its ability to give loft and bulk.

*Production of woollen and semi-worsted yarns (Chapter 11)*
One of the main objectives in the woollen system is to produce yarns from materials of the lowest reasonable cost. Blending will therefore remain one of the most important elements in the process. At present, spinning in the sector is based on ring spindles and mules, and while there should continue to be a movement towards ring spindles, mules will still have their place in the sector, despite their greater operating costs, because they are less severe on the weaker yarns. On the whole, little redevelopment is needed in this sector.

Semi-worsted spinning was only introduced by the industry about ten years ago, but as has been said already, a rapid expansion of production is proposed for the future. This involves fresh investment in new high-performance cards and in sliver yarn spinning machinery which should be operated on a multi-shift system. This investment would be most economic in any available existing buildings which could be found in a Development Area, thus gaining cheap floor space and a grant on new plant. Failing this, an existing suitable mill building outside a Development Area, or a new mill in a Development Area, are economic alternatives.

*Fabric manufacture (Chapter 12)*
The advent of pirnless weaving machines, which have been developed mainly on the Continent, is having a very great impact on all the wool textile industries of the world, particularly in countries where the cost of manpower is high. The machines are highly capital intensive, and are much more economic than the old automatic looms except for short runs, or where special cloth designs, or yarns of low strength, make their use impracticable. The weaving sector at present has pirnless looms for 5 per cent of its capacity, and it is recommended that pirnless capacity should be quickly lifted to 60 per cent for worsted weaving and 35 per cent for woollen. Being highly capital intensive, the new plant should be on multi-shift operation. However, there will then be a surplus of the older automatic and semi-automatic looms, which can be reduced towards day working only to release shift workers for the newer machines.

The proposed developments for producing knitted fabrics should be based mainly on the use of double-jersey large-diameter circular weft knitting machines, and to a lesser extent on modified warp knitting machines. Modified warp knitting is still in its infancy, but is likely to have profound effects during the next few years.

*Colouration (Chapter 13)*

Closed vessels capable of high-temperature dyeing account for only about 15 per cent of capacity in the United Kingdom. This percentage needs to be increased, particularly to match the increasing use of synthetic fibres which cannot be dyed satisfactorily in open vessels. It is recommended, therefore, that all new dyeing plant should be capable of high-temperature work.

There should be a rapid increase in the amount of package yarn dyeing at the expense of top dyeing. This will simplify procedures and reduce costs in the worsted spinning sector, which can then concentrate on larger run-lengths of undyed yarns. It will also simplify stockholding in the industry and enable weavers to offer customers quicker deliveries. Industries on the continent are already offering faster service in international markets by this device, and there is fear that the United Kingdom will suffer unless improvements are made. New equipment is also required for other dyeing stages, particularly for loose-stock dyeing and hank dyeing.

*Mill buildings and stocks of materials (Chapter 14)*

Economic calculations have shown that in general re-equipment should take place within existing mill buildings, and that there is little justification in moving plants to a Development Area. However, individual organisations will need to investigate for themselves the option of re-building where there is special reason such as insufficient bay width for the ideal equipment.

A significant reduction should be made in the amount of stocks and work in progress held within the industry. After allowing for changes in throughput of the various materials, and proposed changes in production, marketing and stockholding policies, it is estimated that the following reductions could be achieved:

| *Material* | *Present stock (million lb)* | *Reduction by 1975 (million lb)* |
|---|---|---|
| Raw wool and hair | 180 | 36 |
| Tops | 45 | 6 |
| Yarns and cloth | 100 | 9 |
| TOTAL | 325 | 51 |

*Financial policies (Chapter 17)*

All these developments will call for a total capital investment of £32·6 million for plant, after allowing for investment grants. This figure is built up as follows:

| *Sector* | *Cost of re-equipment* |
|---|---|
| Combed top production | £1·6 m |
| Converted top production | 0·1 |
| Worsted spinning | 8·2 |
| Woollen yarn production | 3·8 |
| Semi-worsted yarns | 0·5 |
| Worsted weaving | 6·8 |
| Woollen weaving | 7·0 |
| Knitting | 1·6 |
| Dyeing and finishing | 3·0 |
| | £32·6 m |

In addition to this, there are a very large number of small but highly profitable investments of a balancing or consolidating nature within individual mills. These could bring the total capital required for re-equipment to, say, £40 million. All of this investment should be complete by the end of 1975, but the majority should take place as soon as possible. These particular opportunities are only available once, and undue delays may enable companies in other industries such as the Lancashire textile industry or the hosiery and carpet industries to grasp the opportunities instead.

About £25 million can be generated by reducing stocks and work in progress as already described, and it is anticipated that the industry has the ability to raise the rest of the capital needed. It is difficult to estimate with any degree of accuracy the fund-raising power of the sectors, but approximate estimates are as follows:

| *Division* | *Potential to make capital available* |
|---|---|
| Top producers | – |
| Worsted spinners | £12 m |
| Woollen yarn producers | 1 |
| Worsted weavers | – |
| Woollen weavers | 3 |
| Dyers and finishers | 6 |
| Integrated companies | 13 |
| Others | 3 |
| | £38 m |

Comparing these figures with the earlier figures on capital required, it is seen that some money may need to be transfused from the worsted spinners and dyers and finishers into other sectors. This can be achieved satisfactorily by a measure of vertical integration or vertical diversification. Some worsted spinners could spread into combing or knitting, and some dyers could spread into weaving.

Individual organisations can raise money by increasing their gearing with fixed interest loans, by the use of lease or hire-purchase arrangements for new plant, by the mortgage of property, or by the factoring of products for sale. In certain cases it is recommended that companies should approach the Industrial Reorganisation Corporation, who are keen to assist in the redevelopment of the industry.

It has often been said that the main problem of the industry is over-capacity; this is certainly true of certain sectors and pockets within sectors. Over-capacity can be defined as the state when there is too much capacity of economically-viable plant to satisfy the market in hand. Where an innovation is introduced which makes the old plant obsolete, the state of over-capacity ceases, since the old plant should stop working for economic reasons, and the new plant should be built only to the extent that it matches the market. By this definition there will be a high degree of over-capacity of Noble combs, cap spindles, woollen cards, mules, and automatic and semi-automatic looms.

Once this over-capacity develops, secondhand machinery can be easily and cheaply procured, and competition causes prices of the products to fall to a level where little or no return can be obtained on the original purchase price of the machinery. Prices can only be lifted again towards their former level by some action to remove the effective over-capacity. This has been attempted with limited success by the Woolcombers Mutual Association, who have levied subscriptions from combers and used the proceeds to buy and destroy excess combs. It has also been attempted in other industries by horizontal integration to give virtual monopoly. A mutual association is only of limited economic value, but wherever a sector is cohesive enough to form one, it could do a great deal of good in minimising the financial risks of its member businesses, and in sponsoring reorganisation.

The main initiative in a situation of over-capacity must come from the individual businesses with the following options:

(a) To move into different business activities,

(b) To merge with another organisation for an exchange of shares, thus keeping the capital within the industry,

(c) To liquidate, thus passing capital back to shareholders so that they can reinvest elsewhere.

There are many companies within the industry making little or no profit–or even loss–who ought to be taking one of these courses, but are not. Option (a) is difficult where the expertise does not lie within the organisation, and (b) and (c) are unattractive to management, who may jeopardise their positions or their earned incomes (a fear made worse by the prevailing tax laws). Furthermore, liquidation is a very difficult operation, in which company managements have no experience.

It is recommended, therefore, that the industry's federations should take a more positive interest in facilitating appropriate reorganisation, and in keeping tallies of capacity within their sectors. It is also recommended that the industry should sponsor a special professional service skilled in helping unprofitable organisations to analyse, plan and implement for liquidation or merger. It is suggested that the cost of this service might be shared by the federations, the Government and the organisations who use it.

The fact that profitability is low at present is partly the result of organisations being prepared to invest further capital in projects likely to yield only a small rate of return. So long as further capital is invested on this basis, thus adding to capacity in unprofitable areas, there can be no hope of raising the general profit level. It is recommended that organisations should only proceed with new projects where the investment appraisal shows that the additional profit (before tax and depreciation) resulting on the additional capital is at a satisfactorily high level, such as 20 per cent. All the investments proposed in this report are based on a minimum of 20 per cent in a full year (equivalent to a discounted cash flow rate of, say, 12 per cent).

### *Manpower and management policies (Chapter 16)*

When all the proposed production changes have been implemented, the manpower needed in the industry (including management) will have fallen from the present level of 144,000 to 121,000, as shown below. The decrease of 23,000 employees results from four separate causes: firstly the increased output level of the industry would require an increase of 3,000 if its methods remained unchanged; secondly increased productivity due to changes in machinery would liberate 25,000; thirdly increased manual productivity might be expected to liberate about 6,000, and fourthly the diminution in average hours worked by men and women would require an increase of about 5,000.

| *Sector* | *Manpower (including management) in the mid-1970's* | *Change from present manpower* |
|---|---|---|
| Top production | 12,000 | –1,000 |
| Worsted spinning | 34,000 | –8,000 |
| Woollen yarn production | 28,000 | +1,000 |
| Worsted weaving and mending | 13,000 | –8,000 |
| Woollen weaving and mending | 18,000 | –9,000 |
| Knitting | 2,000 | +2,000 |
| Dyeing and finishing | 9,000 | –1,000 |
| Others | 5,000 | +1,000 |
| WHOLE INDUSTRY | 121,000 | –23,000 |

About 20 per cent of production workers are now on multiple-shift work, and it is proposed that this level should be lifted progressively to about 40 per cent by the mid-1970's. This movement towards shift working will involve the employment of a lower proportion of women; it is anticipated that this proportion, including those in administrative positions, should fall from the present level of 49 per cent to about 44 per cent. Such a change fits in well with the social trends and with overall forecasts for manpower availability made recently by the Yorkshire and Humberside Economic Council.

The natural leaving rate of manpower in the industry is high, particularly amongst women, so the reductions in employment can be accomplished more than adequately without need for redundancy. In fact, the wastage rate will be so much in excess of the proposed reductions that there will continue to be a major recruitment problem, as there has been in the recent past.

To ensure satisfactory recruitment, and to reduce labour turnover to a more satisfactory level, it will be necessary to lift wages progressively—nearer to the national average. The greater use of shift working will, of course, also create a need to increase the average remuneration level because of shift premiums. The diminution in manpower in conjunction with increasing output level of the industry should ease the present difficulty which the industry has in financing higher wages.

The survey showed that the management of the industry was excellent in terms of technical knowhow and man-management. Communications between managers and workpeople are good, and there is a great measure of goodwill. These qualities arise from the facts that companies are small (many being family businesses), that there is a very low level of turnover amongst senior management, and that management has been trained on the mill floor and is used to working at close quarters with the workpeople. However, the very reasons that have led to these good qualities have led to others which are not so good: much of the management is weak in the use of certain modern scientific techniques, and is not trained in a manner which would enable it to run larger enterprises requiring much more delegation of authority.

It is recommended that steps should be taken quickly to make good the weaker aspects, mainly by management training, but also by the engagement of a small proportion of managers from other industries. So far, expenditure on management training has been almost insignificant, particularly in Yorkshire. It is suggested that an average of 1 to 2 per cent of all management time—including directors'—should be spent in appropriate training in the future. The amount of training for the younger people earmarked for senior management should, of course, be considerably above the average. The training should include general management education as well as specialised courses and seminars in such subjects as market research, marketing, management controls, costing, operational research and computer technology. Adequate training of the right kind is already available in universities, business schools and special courses, but the industry should consider the possibility of founding a business college in partnership with the other textile industries of the United Kingdom to cater for up to half of the total requirements. The other half of requirements should be met outside the specialised atmosphere of textiles. The industry's Management Services Centre already undertakes some management training for companies, and this service could be expanded.

The move towards shift working will increase the need for shift managers. This will be an ideal opportunity for the talented men to be given an increased experience of direct line management during the more formative years of the early part of their careers. More careful attention to career development is a vital need, partly to attract men of the right quality, and partly to ensure that they are best equipped for the higher positions they may hold in later years.

It has been observed that there is a tendency towards a strongly departmental organisation within companies; that is to say, departmental heads are directly responsible to the chief executive for virtually all aspects of business within their departments. There should now be a strong move towards the creation of functional responsibilities. Foremost amongst these is the marketing function. In most organisations there should be a senior official—usually a director directly responsible to the chief executive—devoting his whole time to marketing. The personnel function, which should include training and career development, will become increasingly important as a result of shift working and larger organisations. The financial function should be strengthened particularly in the field of cost accountancy. All production in an organisation should be unified under a single production director. These are generalisations, of course, concerning most companies. Some companies have already developed along these lines, and others may have special reasons for having a different kind of organisation structure.

*Marketing policies (Chapter 15)*

It is very difficult to formulate marketing policies for individual organisations in a study of this kind, dealing with a whole industry of about 1,000 organisations. The marketing policies of the whole industry are concerned with its future output levels, its products, and where they should be sold; questions such as these are the essence of the whole study, but are not equally applicable to each individual organisation. Nevertheless, each organisation should have a defined marketing policy, partly for the clarity of internal management, partly for the clarity of external image, and partly so that it can specialise in its efforts and optimise its profits.

There should be a much greater tendency for organisations to specialise. This will go a long way towards avoiding the acute competition which partly results at present from a great number of organisations being ready to make the same products. It will also enable costs to be reduced, and quality control to be improved by directing management effort and research into a more confined field of operation. Specialisation should be achieved in any one of a number of different respects. Firstly, the product range or type of design can be limited, secondly the organisation can specialise in long-runs, short-runs, or one-off specials, thirdly there is specialisation in quick delivery at a higher price, as opposed to longer delivery at a lower price, and fourthly there is specialisation by quality. One of the industry's strongest characteristics is that it offers the public freedom of choice from a very wide range of products. This is a requirement of the market which helps the industry maintain sales levels and prices. Specialisation by organisations must therefore be arranged in such a way that there is no interference with variety of product in the market place. The industry as a whole should not specialise, while organisations within it should.

It is recommended that there should be an increased use of product standardisation by the industry in all areas where the diversity of final products is not perceptibly affected. Tops and yarns are intermediate products particularly suited to a standardised range, and it is certain that weavers would buy a much higher proportion of their yarns against standards if they existed and if they were offered the consequent advantages of quicker deliveries or lower prices. The setting up of such standards, which would be for voluntary acceptance by individual buyers, could probably be done by the industry through the auspices of the British Standards Institution. This recommendation is in keeping with the requirement of specialisation, as some companies can produce particular items out of the standard range and others can specialise in non-standards.

Services to customers need to be improved; in particular delivery periods should be shorter, and quoted dates more accurately observed. As has been said earlier, other countries are already offering shorter deliveries in international markets. The increased specialisation and use of standards described above should make a major contribution; so should the proposed investments in yarn package dyeing and high-speed pirnless looms. On the other hand, the pricing policies of organisations, and their conditions of sale, should become firmer. For example, premia should be charged for short-runs and specials, based on correct accounting principles, and the rates of interest on delayed payments should exceed the rates charged on bank overdrafts. Present practice tends to indicate a desire to get work almost in priority of a desire to make a profit; for example some organisations could raise prices thus shortening their order book and enabling a better and quicker service to be offered.

A high proportion of the industry's products is at present sold through merchants and overseas agents. Both channels are sound, and should continue to be used in the future. However, organisations should examine from time to time the prospects of more direct selling, both at home and in overseas countries. Most organisations are too small for direct selling overseas unless they concentrate sales into smaller geographic regions, or merge with companies of like kind, or set up some form of joint-marketing organisation. Loose joint-marketing associations and marketing consortia are not likely to be successful except perhaps as ad-hoc arrangements for short-term endeavours, but it is recommended that, say, ten or more organisations in the same line of business should get together to form joint-marketing companies in which they each take a shareholding, but in such a way that the marketing company becomes a strong and mainly independent management enterprise. It would be bound by two rules in its charter: firstly that it could only sell in defined regions of the world, and secondly that it could only buy from its owning companies. It would be free, however, to buy freely and unequally from its suppliers, and to negotiate prices with them. Such a device might go a long way towards gaining the advantages of mergers without acquiring the disadvantages.

### *Changes in structure of the industry (Chapter 18)*

The increased use of shift operation and the trend towards higher-productivity plant will have the effect of substantially increasing the annual outputs of establishments. This in turn would have the effect of increasing the industry's capacity unless some establishments close down or move into other lines of business. The following figures outline the desirable reduction in the number of establishments sector by sector. It will be noticed that sectors with opportunities for new investment in higher productivity plant, such as the worsted weaving sector, need to suffer a particularly large reduction.

| *Type of establishment* | *Number at present* | *Number in the mid-1970's* |
|---|---|---|
| Top production | 50 | 30 |
| Worsted spinning | 140 | 90 |
| Woollen and semi-worsted yarn production | 80 | 50 |
| Worsted weaving | 120 | 60 |
| Woollen weaving | 70 | 40 |
| Knitting | – | 20 |
| Dyeing and finishing | 120 | 70 |
| Integrated worsted | 50 | 40 |
| Integrated woollen | 170 | 120 |
| Worsted and woollen | 70 | 50 |
| Others (including merchants) | 600 | 380 |
|  | 1,470 | 950 |

One reason for an establishment to move out of the business is that it is too small to enjoy the economies of size, and therefore unlikely to be able to compete in the future. Studies of the economics of scale have led to the conclusion that about 20 per cent of the mills (and 20 per cent of the merchants and other establishments) are likely to become unprofitable on this count. It should be remembered that generalisations made about the smaller establishments do not apply to all—particularly where they are devoted to highly specialised products or are led by men of unusually high talent.

Another reason for establishments to move out of business is that they have old or obsolescent plant in a sector where there are only limited opportunities for reinvestment. Major re-equipment of the industry to serve the export market is not viable, but excess heritage capacity can be used for exports so long as it is sufficiently economic to make a profit at export prices. About 20 per cent of establishments are likely to come into this category by the mid-1970's.

The reduction in the number of establishments will inevitably mean a reduction in the number of independent organisations which own them; the question arises as to whether there should be a further merging of organisations—as has happened in some other industries—to produce fewer and stronger businesses.

Horizontal integration (i.e. integration of organisations in the same sector) has four main advantages: firstly marketing can be centralised and strengthened, secondly production can be rationalised so that establishments are made to specialise more than they might do left to their own devices, thirdly there can be greater training and career opportunities for young management, and fourthly the financial strengths of organisations would be increased. On the other hand, there are two main disadvantages: the valuable motivation of locally-involved proprietorship is weakened, and there is likely to be less individuality in design and quality. Weavers in the USA have merged horizontally to a major extent; this has given them marketing strength and the ability to concentrate funds on the promotion of branded cloths, but has also destroyed much of their flair for design and individuality compared with their British counterparts. On balance a measure of horizontal merging is recommended, particularly amongst the smaller companies. However, the rate of merging should not be so great that management is thrown into an unfamiliar situation, or that the great diversity of products and customer service is impaired.

Some of the arguments for and against horizontal integration apply to vertical integration, but in many cases vertical integration would be contrary to the needs of specialisation. If an organisation is not tied to particular markets it is free to specialise in products or services and market them to a wide range of other organisations; but if it is tied to one outlet it may have to provide the blend of products and services required by the outlet. Nevertheless, under certain circumstances (including weak markets and short order books) there can be a major financial advantage in an organisation merging with a market outlet sufficiently large to ensure that production in the first organisation is lifted near to full capacity. There will be some useful opportunities for spinners to acquire weavers, knitters and carpet makers, and some opportunities for weavers and knitters to acquire makers-up of clothing where there is line production of standard items. Not much vertical integration is recommended, and this should in general be limited to the larger organisations who already enjoy the advantages of horizontal integration.

Following the liquidation of some organisations, and the horizontal and vertical integration of others on the lines described above, it is suggested that the number of independent organisations in the industry should be about 600 by 1975, compared with 1,000 now. The changes are made up as follows:

| *Type of organisation* | *Number at present* | *Number in the mid-1970's* |
|---|---|---|
| Top production | 20 | 15 |
| Worsted spinning | 65 | 35 |
| Woollen yarn production | 35 | 20 |
| Worsted weaving | 60 | 25 |
| Woollen weaving | 35 | 20 |
| Knitting | – | – |
| Dyeing and finishing | 100 | 60 |
| Integrated worsted | 30 | 25 |
| Integrated woollen | 130 | 80 |
| Worsted woollen | 60 | 40 |
| Others (including merchants) | 465 | 280 |
| | 1,000 | 600 |

The wool textile industry has already built up strong federations and central organisations including export service, research centre, management services unit and statistics bureau. Indeed, for its size the industry is one of the more advanced in this respect. It is felt that there would be advantages in increasing the degree of centralisation by uniting the functions of the Wool Textile Delegation and the Wool and Allied Textile Employers' Council. A reduction in the number of the industry's sectoral federations (recently reduced from thirteen to eleven) would also be in keeping with trends in the structure of the industry, and would increase their financial strengths and abilities to organise corporate activity. Looking further into the future, there may well be a need to integrate the federation structures of the wool textile industry and the other textile industries of the United Kingdom. However, the differences between the industries are still too great for this to serve a useful purpose now.

It is recommended that companies should make more use of the central services within the industry, that increasing funds should be made available to these services, and that a new market intelligence service should be formed.

Seventeen trade unions in the industry have recently been reduced to fifteen. All except the General and Municipal Workers' Union are members of the National Association of Unions in the Textile Trade, which undertakes most bargaining at national level. The number of individual trade unions should be reduced in the course of time, and every attempt made to increase the mobility of labour from one trade within the industry to another. It has already been said that labour relations are good; indeed the industry has had virtually no strikes since 1930, and does not suffer from restrictive practices to any significant extent. However, the changes anticipated for the industry, including shift working and greater mechanisation and productivity, will alter the psychological patterns and bring in pressures not yet experienced. An ideal opportunity exists for trades unions and managements to leapfrog the transitional period of bad relations to which so many other industries have been subjected, thus moving into a designed method of working for the 1970's.